5.0 INDUSTRY SUBCATEGORIZATION

The division of a point source category into groups called "subcategories" provides a mechanism for addressing variations among products, raw materials, processes, and other parameters that can result in distinct effluent characteristics. This provides each subcategory with a uniform set of effluent limitations guidelines that take into account technology achievability and economic impacts unique to that subcategory. In developing effluent limitations, EPA assesses several factors including manufacturing processes, products, the size and age of the facility, water use, and wastewater characteristics. The Transportation Equipment Cleaning Industry (TECI), however, is not typical of many of the other industries regulated under the Clean Water Act (CWA) because it does not produce a product. Therefore, EPA developed additional factors that specifically address the characteristics of transportation equipment cleaning (TEC) operations. Similarly, several factors typically considered for subcategorization of manufacturing facilities were not considered applicable to this industry. For this rulemaking, EPA considered the following factors:

- Cleaning processes (production processes);
- Tank type cleaned;
- Cargo type cleaned;
- Water use practices;
- Wastewater characteristics;
- Facility age;
- Facility size;
- Geographical location;
- Water pollution control technologies;
- Treatment costs; and
- Non-water quality environmental impacts.

After evaluating the above factors, EPA determined that subcategorization of the TECI is necessary.

5.1 Factors Considered for Basis of Subcategorization

EPA considered a number of potential subcategorization approaches for the TECI. EPA used information collected during 44 engineering site visits, the Screener Questionnaire for the TECI (1), and the Detailed Questionnaire for the TECI (2) to develop potential subcategorization approaches. EPA considered eleven factors in developing its subcategorization scheme for the TECI. A discussion of each is presented below, and a detailed analysis can be found in the Subcategorization Analysis for the Transportation Equipment Cleaning Industry (3).

Consistent with other effluent guidelines subcategorization efforts, information presented in this section is based on operations performed by the estimated total TECI population of 1,229 facilities. This total includes an estimated 692 discharging facilities and 537 zero discharge facilities. Section 3.2.3.4 further discusses these facilities.

5.1.1 Cleaning Processes (Production Processes)

EPA interpreted “production processes” to be the cleaning processes used by TEC facilities. Section 4.3 describes TEC operations and the various methods used to clean tank interiors. In summary, the cleaning process descriptions provided in Section 4.3 show the following characteristics within the TECI:

1. Fundamental cleaning processes are the same for all tanks;
2. Use of chemical cleaning solutions versus solely water washes is dependent upon the type of cargo cleaned;
3. Cleaning equipment includes either low- or high-pressure spinner nozzles or hand-held wands and nozzles;
4. Heel volumes vary significantly depending on the type of tank cleaned;
5. Time required for tank cleaning varies significantly depending on the tank type and cargo type cleaned;

6. Rail car cleaning processes are more likely to include steam cleaning than truck or barge cleaning processes;

7. Hopper barge cleaning processes differ significantly from tank barge cleaning processes; and

8. Cleaning processes for food grade cargos differ significantly from cleaning processes for other cargo types.

Characteristics 1 and 3 were not considered bases for industry subcategorization and were not evaluated further.

Characteristics 2 and 8 suggest potential subcategorization of the TECI based on use of chemical solutions and/or type of cargo cleaned. EPA analyzed the use of chemical cleaning solutions in the TECI and the relationship between the use of chemical cleaning solutions and type of cargo cleaned in the TECI. Approximately 56% of TEC facilities use chemical cleaning solutions in one or more of their cleaning processes. Facilities that clean a variety of cargo types (i.e., five or greater) are more likely to use chemical cleaning solutions than facilities that clean four or fewer cargo types. EPA further evaluated facilities that clean four or fewer cargo types to identify trends based on specific cargo types cleaned. Significantly, only 4% of facilities that clean only petroleum and coal products use chemical cleaning solutions. For the remaining facilities grouped by cargo types cleaned, the use of chemical cleaning solutions is not a distinguishing factor.

Characteristics 4, 5, 6, and 7 suggest potential subcategorization of the TECI based on the type of tank cleaned. However, characteristics 4 and 5 were not analyzed further because these characteristics are not anticipated to result in distinct effluent characteristics. For example, the volume of heel removed is primarily an indication of product offloading efficiency by the consignee rather than an indication of the efficiency of heel removal (an associated water pollution prevention practice) by the cleaning facility. The time required for cleaning is often an indication of the duration of recirculating wash cycles, which generally do not generate wastewater.

EPA evaluated the relationship between the predominant type of tank cleaned and the use of chemical cleaning solutions. This analysis revealed that none of the facilities that clean predominantly closed-top hoppers uses chemical cleaning solutions, indicating that these facilities use significantly different cleaning processes than tank truck, rail tank car, and tank barge cleaning facilities. As determined from Detailed Questionnaire responses, typical cargos cleaned by closed-top hopper facilities include dry bulk products such as agricultural chemicals, fertilizers, and coal cargos not typically hauled in tank trucks, rail tank cars, and tank barges. Therefore, closed-top hopper cleaning facilities are unique from other facilities based on both cleaning processes used and cargo types transported.

In summary, these results indicate differences between certain types of facilities based on cleaning processes used. Unique facility types include facilities that clean a wide variety of cargo types, facilities that clean only food grade products, facilities that clean only petroleum and coal products, and facilities that clean predominantly closed-top hoppers. However, these differences are primarily related to cargo types and tank types cleaned. Further subcategorization analyses related to cargo types and tank types cleaned are described below. Therefore, cleaning processes alone were not considered an appropriate basis for subcategorization.

5.1.2 Tank Type Cleaned

EPA analyzed the distribution of TEC facilities by tank type and combinations of tank types cleaned. Section 4.4 of this document discusses in detail the various tank types cleaned. In general, facilities responding to the Detailed Questionnaire reported cleaning the nine primary tank types listed below:

- Tank Truck (T);
- Rail Tank Car (R);
- Tank Barge (B);
- Intermediate Bulk Container (IBC);
- Intermodal Tank Container (IM);
- Ocean/Sea Tanker (NT);
- Closed-Top Hopper Truck (TH);

- Closed-Top Hopper Rail Car (RH); and
- Closed-Top Hopper Barge (BH).

The majority of facilities in the TECI (913 of 1,229 facilities) reported cleaning only one primary tank type, indicating that the TECI is mostly characterized by facilities that clean only one primary tank type. Of these 913 facilities, 73% clean only tank trucks and 11% clean only rail tank cars. The remaining 16% of facilities clean, in descending order by percentage of facilities, only intermediate bulk containers, closed-top hopper trucks, tank barges, closed-top hopper barges, or ocean/sea tankers. None of the facilities (as represented by the Detailed Questionnaire sample population) clean only either intermodal tank containers or closed-top hopper rail cars.

EPA conducted 44 engineering site visits at facilities that clean tank trucks, rail tank cars, or tank barges. Information collected during these visits suggests many distinct physical and operational characteristics among these three facility types that warrant distinct subcategories for these three facility types. First, although all three facility types use chemical cleaning solutions in tank cleaning processes as discussed above, rail tank car cleaning facilities are more likely than other facility types to use steam in place of, or in addition to, chemical cleaning solutions in the cleaning process. Second, the specific cargos cleaned by the three facility types vary significantly. Tank trucks are used to transport refined end-use products. This contrasts with tank barges, which are used to transport predominantly crude, unrefined cargos and major manufacturing feedstock cargos such as petrochemicals and bulk oils (including foodgrade oils). Cargos transported by rail tank car include products primarily in the middle of this cargo type range, between crude, unrefined products and refined end-use products. Third, volume and characteristics of wastewater generated by these facility types differ significantly, as described in Section 6.0. Finally, as a result of differences in the volume and characteristics of wastewater generated, average wastewater treatment costs currently incurred by facilities differ significantly for these facility types.

Facilities that clean ocean/sea tankers represent less than one percent of facilities within the TECI. Cleaning operations performed and specific commodities cleaned are similar to those of tank barges, although different in scale. Based on the size of the ocean/sea tanker cleaning segment and its similarity to the tank barge segment, development of a separate subcategory within the TECI for ocean/sea tankers is not warranted.

Thirteen percent of facilities clean combinations of tank types; all of these facilities clean tank trucks and some combination of intermediate bulk containers and/or intermodal tank containers. Information collected during engineering site visits at these facilities indicates that the cargo types cleaned and cleaning operations performed are identical for tanks and containers, with minor modifications for cleaning intermediate bulk containers due to their relatively small capacity. Therefore, development of a separate subcategory within the TECI for intermediate bulk and/or intermodal tank containers is not warranted.

An additional 12% of facilities clean both tanks and closed-top hoppers within the same mode of transportation (i.e., T and TH, R and RH, or B and BH). An analysis of these facilities indicates that they clean either predominantly tanks or predominantly closed-top hoppers. Based on this characterization, development of a separate subcategory within the TECI for these facilities is not warranted. These facilities are best characterized and regulated as facilities with operations in multiple subcategories.

In summary, these results indicate significant differences between facilities based on tank types cleaned. Therefore, EPA determined that subcategorization based, in part, on tank types cleaned is appropriate.

5.1.3 Cargo Type Cleaned

EPA considered subcategorizing the TECI based on the cargo type cleaned. Respondents to the Detailed Questionnaire reported cleaning tanks which transported 15 general cargo types. The reported cargo types are listed below:

- Group A - Food Grade Products, Beverages, and Animal and Vegetable Oils;
- Group B - Petroleum and Coal Products;
- Group C - Latex, Rubber, and Resins;
- Group D - Soaps and Detergents;
- Group E - Biodegradable Organic Chemicals;
- Group F - Refractory (Nonbiodegradable) Organic Chemicals;
- Group G - Inorganic Chemicals;
- Group H - Agricultural Chemicals and Fertilizers;
- Group I - Chemical Products;
- Group J - Hazardous Waste (as defined by RCRA in 40 CFR Part 261);
- Group K - Nonhazardous Waste;
- Group L - Dry Bulk Cargos (i.e., hopper cars); and
- Group M, N, and O - Other (Not Elsewhere Classified).

Forty-eight percent of facilities in the TECI clean only one cargo type, while 52% clean a variety of cargo types. Of the facilities that reported cleaning only one cargo type, 65% reported cleaning food grade products, beverages, and animal and vegetable oils (Group A), 16% reported cleaning petroleum and coal products (Group B), and 10% reported cleaning “other cargos” (Groups M, N and O). A review of the data for facilities that clean two or more cargos suggests no apparent trend in cargo types cleaned, but rather a wide variety of combinations of “chemical-type” cargos.

EPA was not able to identify any other distinct segments of the TECI among the remaining groups, which included Latex, Rubber, and Resins (Group C), Soaps and Detergents (Group D), Biodegradable Organic Chemicals (Group E), Refractory (Nonbiodegradable)

Organic Chemicals (Group F), Inorganic Chemicals (Group G), Agricultural Chemicals and Fertilizers (Group H), Chemical Products (Group I), Hazardous Waste (Group J), Nonhazardous Waste (Group K), and Groups M, N, and O consisting of cargos not elsewhere classified.

There are several reasons to consider subcategorization based on type of cargo. Facilities that clean tanks which contained only food grade products (Group A), petroleum grade products (Group B), or dry bulk goods (Group L) represent distinct and relatively large segments of the TECI that differ significantly from facilities that clean tanks containing a wide variety of cargos. The type of cargo transported and the type of cleaning processes utilized influences wastewater characteristics. EPA therefore concluded that subcategorization of the TECI based, in part, on cargo type is an appropriate means of subcategorization.

Specifically, EPA developed a separate subcategory for facilities that clean tanks that contained food grade cargos. EPA also developed separate subcategories for facilities that clean closed-top hoppers (i.e., vessels that contained dry bulk goods).

EPA considered developing separate subcategories for facilities that clean tanks that contained “chemical” cargos and for facilities that clean tanks that contained “petroleum” cargos. EPA compared raw wastewater characterization data collected for wastewaters generated from barge/chemical and barge/petroleum facilities and concluded the wastewater characteristics and treatability were similar. Therefore, EPA decided to combine these subcategories.

EPA also compared raw wastewater characterization data for the truck/chemical and truck/petroleum facilities, but found fewer similarities. For example, fewer pollutants were detected at the truck/petroleum facility than at the truck/chemical facilities, and similarly detected pollutants were found at lower concentrations at the truck/petroleum facility. However, EPA is concerned that its wastewater characterization data for truck/petroleum facilities does not capture all pollutant loadings attributable to these facilities (see discussion in Section 6.5) and that apparent differences in wastewaters for these facilities are incorrect.

In addition, EPA found it difficult to clearly define “chemical” versus “petroleum” cargos and was concerned that the rule incorporating separate subcategories would be difficult to implement. EPA instead decided to develop combined “chemical and petroleum” subcategories in order to provide unambiguous, straightforward definitions which provide clear direction for implementation.

5.1.4 Water Use and Wastewater Reuse Practices

TEC facilities use water for cleaning and rinsing as well as for a number of ancillary purposes such as hydrotesting, air pollution control, and process cooling water. Water use varies based on a number of factors including type of tank cleaned, type of cleaning solution utilized, type of cargo last contained in the tank, type of cargo to be transported, and tank capacity. Significant observations of distinctions in water use include:

- Rail facilities use significantly larger volumes of water for tank hydrotesting than truck facilities, presumably because rail tanks have larger capacities; barge cleaning facilities do not report performing hydrotesting.

- Truck facilities use significantly larger volumes of water for tank exterior cleaning operations, presumably because tank exterior appearance is more important for trucks, which are highly visible to the public.

- Rail facilities use significantly larger volumes of boiler water, presumably because of their more extensive use of steam cleaning. (Virtually all facilities, regardless of tank type, use boilers to heat cleaning solutions and rinses and to heat air for tank drying.)

- Food grade facilities use significant volumes of cooling water, both for TEC operations and for other on-site processes (e.g., juice processing, rendering).

- Petroleum facilities use significantly larger volumes of tank hydrotesting water, presumably because petroleum tanks are often in dedicated service and are cleaned primarily to facilitate inspection, which typically includes tank hydrotesting.

These observations indicate differences among facilities based on water use practices; however, these differences are primarily related to types of tanks and cargos cleaned.

EPA also investigated facilities that do not discharge TEC process wastewater to surface waters or to POTWs (i.e., zero discharge facilities) to determine whether they exhibited any unique water use characteristics that might represent a distinct subcategory. Of the estimated 537 zero discharge facilities, 46% achieved zero discharge by hauling their wastewater off site for treatment and/or disposal. Facilities may haul wastewater off site because it is less expensive than on-site treatment. An estimated 46% of zero discharge facilities disposed of their wastewater by on-site land application, land disposal, deep-well injection, or evaporation. These alternative disposal options are available to some facilities because of site-specific conditions which may include being situated on land suitable for land-application, or being located close to an off-site waste treatment facility.

Only 8% of zero discharge facilities recycled or reused 100% of their TEC process wastewater. Of these, 70% clean predominantly (i.e., 95% or greater) tanks that last contained petroleum and coal products. As noted in Section 6.0, facilities that clean tanks containing petroleum and coal products discharge significantly less wastewater per tank cleaned than other types of facilities.

In summary, the variations in water use practices among different types of facilities demonstrate that the most appropriate method of subcategorization that encompasses water use practices is based on the type of tank cleaned and type of cargo cleaned at a facility.

5.1.5 Wastewater Characteristics

EPA evaluated two wastewater characteristics for this subcategorization analysis: volume of tank interior cleaning wastewater generated per tank cleaned and concentration and types of pollutants in TEC process wastewater. Section 6.0 provides additional information concerning these two wastewater characteristics.

In order to evaluate wastewater volumes, EPA calculated the median wastewater volume generated per tank cleaned from several different tank and cargo classifications. The classifications selected represented cleaning processes performed, tank type cleaned, cargo type cleaned, and water use and wastewater reuse practices described earlier in this section.

The median tank interior cleaning wastewater volumes generated by tank type (gallons per tank) indicate significant differences, particularly for tank trucks (452) versus rail tank cars (1,229) and tank barges (1,669); and for tanks (452 to 1,669) versus closed-top hoppers (144 to 712). The median tank interior cleaning wastewater volumes generated by tank type and cargo type (gallons per tank) also indicate significant differences, particularly for truck/chemical (449) versus rail/chemical (1,701) versus barge/chemical (2,365); and for chemical (449 to 2,365) versus petroleum (11 to 150).

EPA also evaluated available raw wastewater characterization data by tank type and cargo classification. Significant observations from these analyses include:

- The number and types of pollutants detected at truck/chemical, rail/chemical, and barge/chemical facilities were similar.
- Fewer pollutants were detected at the truck/petroleum facilities than at the truck/chemical facilities, and similarly detected pollutants were found at lower concentrations at the truck/petroleum facilities.
- The majority of pollutants detected at barge/chemical facilities were also detected at the barge/petroleum facility.
- The number and types of pollutants detected in the truck/food, rail/food, and barge/food facilities were similar.
- The one closed-top hopper barge facility sampled was significantly different from the other facility types in terms of the number of priority pollutants detected, the total number of pollutants detected, and the specific pollutants detected.

In conclusion, the distribution of median wastewater volume generated supports the development of distinct subcategories within the TECI based on tank type and cargo type cleaned. Analysis of raw wastewater characterization data collected during EPA's sampling program also supports development of distinct subcategories within the TECI.

5.1.6 Facility Age

EPA evaluated the age of facilities as a possible means of subcategorization because older facilities may have different processes and equipment that result in different wastewater characteristics, and which therefore may require significantly greater or more costly control technologies to comply with regulations.

EPA evaluated the treatment technologies in place as related to the year in which the facility first conducted TEC operations. For this analysis, EPA characterized older facilities as those that began TEC operations prior to 1980, and compared their wastewater treatment-in-place to that of facilities that began TEC operations after 1980. Treatment-in-place was evaluated by whether facilities use treatment technologies classified as follows: no treatment, pretreatment, primary treatment, secondary treatment, and advanced treatment. The specific treatment technologies included within these technology classifications are listed in the Detailed Questionnaire Data Element Dictionary (4). These analyses indicated that older facilities are as likely to be currently operating treatment in place for each wastewater treatment classification as are newer facilities. In addition, many older facilities have improved, replaced, or modified equipment over time.

As described in Section 6.0, wastewater characteristics are predominantly dependent on the type of cargos being cleaned, the type of tank being cleaned, and the types of cleaning operations performed. The age of a facility does not have an appreciable impact on wastewater characteristics and was not considered as a basis for subcategorization.

5.1.7 Facility Size

EPA considered subcategorization of the TECI on the basis of facility size. Three parameters were identified as relative measures of facility size: number of employees, number of tanks cleaned, and wastewater flow. EPA found that facilities of varying sizes generate similar wastewaters and use similar treatment technologies within the subcategorization approach. A detailed discussion of the pollutant loadings associated with small facilities can be found in the "Final Cost-Effectiveness Analysis of Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Category" (5). EPA determined that the industry should not be subcategorized based on facility size. However, EPA is promulgating an exclusion for facilities that discharge less than 100,000 gallons per year of TEC process wastewater to provide relief and flexibility for facilities that perform a relatively small number of TEC operations and for permit authorities.

5.1.8 Geographical Location

EPA performed a geographical mapping analysis of the Detailed Questionnaire sample population of 142 facilities (discharging facilities plus zero discharge facilities). Note that a simple geographical mapping of these 142 facilities may not accurately represent the TECI because each facility in the sample population has a unique statistical survey weight, ranging from 1 to 87.6, which is not reflected in the maps; however, the mapping analysis may be appropriate to identify potential geographic trends within the TECI. Maps were prepared to reflect all surveyed facilities and to reflect facilities classified by tank type and by cargo type (these maps are also presented and discussed in Section 4.9). The following geographic trends were observed:

- TEC facilities are located primarily within the industrial portions of the United States, with relatively high concentrations in the area between Houston and New Orleans and within specific urban areas, such as Los Angeles, Chicago, and St. Louis;
- The distribution of truck facilities mirrors the distribution of all facilities;

- The distribution of rail facilities shows lower concentrations in the area between Houston and New Orleans and higher concentrations across eastern Texas as compared to all TEC facilities;

- Barge facilities are located along inland waterways of the United States;

- The distribution of chemical facilities resembles the distribution of all TEC facilities except for a relatively lower concentration of facilities in the northwestern region of the United States;

- Food grade facilities are specifically not located within the area between Houston and New Orleans, and appear to be located primarily within agricultural areas of the United States; and

- Petroleum facilities are not concentrated in the area between Houston and New Orleans, an area typically associated with the petroleum industry.

These trends suggest differences among facilities based on geographic distribution; however, these differences are primarily related to types of tanks and cargos cleaned. Therefore, geographic location alone is not an appropriate basis for subcategorization.

Geographic location may impact costs if additional land is required to install treatment systems, since the cost of land will vary depending on whether the site is located in an urban or rural location. The treatment systems used to treat TEC wastewaters typically do not have large land requirements; therefore, subcategorization based on land availability is not appropriate. Water availability is also a function of geographic location. However, limited water supply encourages conservation by efficient use of water, including recycling and reuse, and encourages the early installation of practices advisable for the entire category to reduce treatment costs and improve pollutant removals. For this reason also, geographic location alone is not an appropriate basis for subcategorization.

5.1.9 Water Pollution Control Technologies

EPA evaluated water pollution control technologies currently being used by the industry as a basis for establishing regulations. The technologies are appropriate for the wastewater characteristics typical of the TECI. As discussed in Section 5.1.5, TEC wastewater characteristics (including wastewater volume generated and pollutant concentrations) are dependent upon tank type and cargo type cleaned. Sections 5.1.2 and 5.1.3 discuss subcategorization of the TECI based on tank type and cargo type cleaned, respectively. Therefore, water pollution control technologies alone are not considered an appropriate basis for subcategorization.

5.1.10 Treatment Costs

Treatment costs vary significantly among facilities and are primarily dependent upon water pollution control technologies being used and on facility wastewater flow rates. As discussed in Section 5.1.9, water pollution control technologies used are based upon the facility wastewater characteristics, which are dependent upon tank type and cargo type cleaned. Therefore, treatment costs alone are not considered an appropriate basis for subcategorization.

5.1.11 Non-Water Quality Environmental Impacts

Non-water quality environmental impacts from the TECI result from solid waste disposal, transportation of wastes to off-site locations for treatment and disposal, and emissions of volatile organic compounds to the air. However, as these impacts are a result of individual facility practices and do not apply uniformly across different industry segments, non-water quality environmental impacts are not an appropriate basis for subcategorization. Section 11.0 provides further information concerning non-water quality environmental impacts of the TECI.

5.2 Selection of Subcategorization Approach

Based on its evaluation of the above factors, EPA determined that subcategorization of the TECI is necessary and that different effluent limitations and pretreatment standards should be developed for subcategories of the industry. EPA concluded that the most appropriate basis for subcategorization of the industry be based on tank type and cargo type cleaned.

The tank type classifications for this rule include: (1) tank trucks and intermodal tank containers; (2) rail tank cars; (3) tank barges and ocean/sea tankers; (4) closed-top hopper trucks; (5) closed-top hopper rail cars; and (6) closed-top hopper barges. A description of each of these tank type classifications is presented in Section 15.0. Containers defined as drums or intermediate bulk containers (IBCs) are not covered by this guideline.

The cargo type classifications used as a basis for subcategorization include: (1) food grade; (2) dry bulk; and (3) chemical and petroleum. A description of the cargo type classifications is provided below.

Food Grade - **"**Food grade" cargos include edible and non-edible food products. Specific examples of food grade products include, but are not limited to, the following cargos: alcoholic beverages, animal by-products, animal fats, animal oils, caramel, caramel coloring, chocolate, corn syrup and other corn products, dairy products, dietary supplements, eggs, flavorings, food preservatives, food products that are not suitable for human consumption, fruit juices, honey, lard, molasses, non-alcoholic beverages, salt, sugars, sweeteners, tallow, vegetable oils, vinegar, and pool water.

Dry Bulk - The dry bulk classification includes cargos containing dry bulk products such as grain, soybeans, soy meal, soda ash, lime, fertilizer, plastic pellets, flour, sugar, and similar commodities or cargos.

Chemical - Chemical cargos include, but are not limited to, the following cargos: latex; rubber; plastic; plasticizers; resins; soaps; detergents; surfactants; agricultural chemicals and pesticides; hazardous waste; organic chemicals including: alcohols, aldehydes, formaldehydes, phenols, peroxides, organic salts, amines, amides, other nitrogen compounds, other aromatic compounds, aliphatic organic chemicals, glycols, glycerines, and organic polymers; refractory organic compounds including: ketones, nitriles, organo-metallic compounds containing chromium, cadmium, mercury, copper, zinc; and inorganic chemicals including: aluminum sulfate, ammonia, ammonium nitrate, ammonium sulfate, and bleach. Cargos which are not considered to be food grade, petroleum, or dry bulk goods are considered to be chemical cargos.

Petroleum - Petroleum cargos include the products of the fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking, or other refining processes. For purposes of this rule, petroleum cargos also include products obtained from the refining or processing of natural gas and coal. Specific examples of petroleum products include, but are not limited to: asphalt; benzene; coal tar; crude oil; cutting oil; ethyl benzene; diesel fuel; fuel additives; fuel oils; gasoline; greases; heavy, medium, and light oils; hydraulic fluids; jet fuel; kerosene; liquid petroleum gases (LPG) including butane and propane; lubrication oils; mineral spirits; naphtha; olefin, paraffin, and other waxes; tall oil; tar; toluene; xylene; and waste oil.

Facilities that clean petroleum and/or chemical cargos are further subcategorized by tank type as follows:

- Truck/Chemical & Petroleum;
- Rail/Chemical & Petroleum; and
- Barge/Chemical & Petroleum.

Definitions of these subcategories are provided at the end of this section.

Facilities that clean food grade cargos are combined into a single Food Subcategory (definition provided at the end of this section). EPA determined that further subcategorization of these facilities by tank type was not warranted for several reasons. First, the pollutants of concern (i.e., conventional pollutants as discussed in Section 6.5) and achievable effluent quality are identical for all three facility types. Second, large differences in wastewater volumes generated are not significant because EPA has promulgated concentration-based rather than mass-based effluent limitations. Note that EPA is regulating Food Subcategory wastewater that is directly discharged but is not regulating wastewater that is indirectly discharged.

Facilities that clean closed-top hoppers (used to transport dry bulk cargos) are further subcategorized by transportation mode as follows:

- Truck/Hopper;
- Rail/Hopper; and
- Barge/Hopper.

Definitions of these subcategories are provided at the end of this section. Note that EPA is not regulating wastewater discharges from cleaning closed-top hoppers.

In summary, EPA has divided the TECI into the following 7 subcategories. Definitions of these subcategories are provided below:

Truck/Chemical & Petroleum

This subcategory applies to TEC facilities that clean tank trucks and intermodal tank containers which have been used to transport chemical or petroleum cargos.

Rail/Chemical & Petroleum

This subcategory applies to TEC facilities that clean rail tank cars which have been used to transport chemical or petroleum cargos.

Barge/Chemical & Petroleum

This subcategory applies to TEC facilities that clean tank barges or ocean/sea tankers which have been used to transport chemical or petroleum cargos.

Food

This subcategory applies to TEC facilities that clean tank trucks, intermodal tank containers, rail tank cars, tank barges, or ocean/sea tankers which have been used to transport food grade cargos.

Truck/Hopper

This subcategory applies to TEC facilities that clean closed-top hopper trucks.

Rail/Hopper

This subcategory applies to TEC facilities that clean closed-top hopper rail cars.

Barge/Hopper

This subcategory applies to TEC facilities that clean closed-top hopper barges.

5.3 References[1]

1. U.S. Environmental Protection Agency. Information Collection Request, Tank and Container Interior Cleaning Screener Questionnaire. December 1993 (DCN T00312).

2. U.S. Environmental Protection Agency. Information Collection Request, 1994 Detailed Questionnaire for the Transportation Equipment Cleaning Industry. November 1994 (DCN T09843).

3. Eastern Research Group, Inc. Subcategorization Analysis for the Transportation Equipment Cleaning Industry. May 5, 1998 (DCN T04653).

[1]For those references included in the administrative record supporting the TECI rulemaking, the document control number (DCN) is included in parentheses at the end of the reference.

4. Eastern Research Group, Inc. Data Element Dictionary for Part A of the U.S. Environmental Protection Agency 1994 Detailed Questionnaire for the Transportation Equipment Cleaning Industry. April 4, 1997 (DCN T10271).

5. U.S. Environmental Protection Agency. Final Cost-Effective Analysis of Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Category. EPA 821-R-00-014, June 2000.

6.0 WATER USE, WASTEWATER CHARACTERIZATION, AND POLLUTANTS OF INTEREST

As part of the characterization of the Transportation Equipment Cleaning Industry (TECI), EPA determined water use and wastewater generation practices associated with transportation equipment cleaning (TEC) operations and assessed what constituents are typically found in TEC wastewater. Information presented in this section is based on data provided by facilities in response to the Detailed Questionnaire and obtained by EPA's site visit and sampling programs. The Detailed Questionnaire database includes information regarding each facility's water use, wastewater discharge, and disposal practices. The following topics are discussed in this section:

- Section 6.1: An overview of water use and wastewater generation in the TECI;
- Section 6.2: The sources of wastewater identified in the TECI;
- Section 6.3: A discussion of the wastewater discharge practices within the TECI;
- Section 6.4: An overview of water reuse and recycling in the TECI;
- Section 6.5: Wastewater characterization data collected during EPA's sampling program; and
- Section 6.6: The pollutants of interest for the TECI.

Sections 6.1, 6.2, and 6.3 discuss water use and wastewater generation, sources of wastewater, and wastewater discharge practices at only the estimated total TECI population of 692 discharging facilities. Section 6.4 includes water reuse and recycling information on the discharging facilities as well as the zero discharge facilities. Section 6.5 presents EPA wastewater characterization data collected from 20 sampling episodes, and Section 6.6 lists the pollutants of interest, by subcategory, for the TECI.

Some data summaries included in this section are presented by tank type and cargo type cleaned. The combination of tank type and cargo type cleaned is referred to as the “facility type.” To simplify data analyses by facility type, EPA assigned facilities that clean multiple cargo types to a single, predominant cargo group. Therefore, for these facilities, facility characteristics for all facility operations are attributed to the single predominant cargo group.

6.1 Water Use and Wastewater Generation

This section describes water use and wastewater generation practices of discharging facilities which, by definition, use water or water-based cleaning solutions to clean or rinse tank interiors. The amount of water required and wastewater generated to clean each tank depends upon the cleaning process, as well as the tank type, tank size, and commodity last transported. In addition, the TECI uses water and generates wastewater during other processes related to TEC operations. The most significant uses of water associated with TEC operations include:

- Tank interior prerinse, prior to cleaning;
- Tank interior cleaning hot or cold water washes and/or rinses;
- Tank exterior washing;
- Boiler feed water for conversion to steam for steam cleaning, for heating cleaning solutions, or heating or drying tank interiors; and
- Formulation of cleaning solutions.

Following removal of the transported commodity from the tank, a residue or heel remains, which is generally removed prior to tank cleaning. During or after heel removal, TEC facilities may perform a rinse prior to commencing cleaning consisting of a short burst of water applied to the tank interior to remove additional heel that adheres to the tank’s interior. Purposes of the prerinse include (1) enhancing heel removal; (2) minimizing the amount of heel ultimately contained in tank cleaning wastewater (pollution prevention); (3) extending the service life of tank cleaning solutions by reducing solution contamination from tank heel; and (4) protecting the wastewater treatment system, which may not be acclimated or designed to treat residual heel. Prerinse wastewater is typically segregated from, rather than commingled with, subsequent TEC wastewater.

TEC facilities perform hot or cold water washes and rinses to clean tank interiors. Water-soluble cargos and petroleum and coal products are typically cleaned using only hot or cold water washes without chemical cleaning solutions. Virtually all cleaning sequences include a final water rinse to remove cleaning solution residue, particularly when recirculated cleaning solutions or water are used during the cleaning process. Steam cleaning is also performed, particularly by rail tank car cleaning facilities. Tank interior cleaning is typically the largest use of water at TEC facilities.

Large volumes of water are typically used to clean tank exteriors, particularly at tank truck cleaning facilities where appearance is important due to the high visibility on roadways. Soaps and hydrofluoric acid-based aluminum brighteners may also be used in this process. On-site boilers may use significant volumes of water both as a feed stream and for maintenance, such as during boiler blowdown. Finally, since cleaning solutions are often received in concentrated form, water is used to formulate the cleaning solutions to appropriate concentrations. Water is also used to “make up” cleaning solutions, due to loss by evaporation and solution carry-over into subsequent tank rinse wastewater.

Table 6-1 summarizes the total annual volume of wastewater generated by the TECI. Since many facilities perform both TEC and non-TEC operations, this table includes both the amount of wastewater generated by TEC operations (total TEC wastewater) and the total amount of wastewater reported to be generated by the TECI (total TEC and non-TEC wastewater). Approximately 5.5 billion gallons of wastewater (both TEC and non-TEC wastewater) is generated annually by the TECI. Facilities that clean tank trucks last containing food cargos account for 70% of this volume, due to the large number of tanks cleaned, relatively greater use of exterior cleaning as part of the routine tank cleaning procedures, and wastewater generated by food processing operations at many truck/food facilities. Truck/chemical facilities, having the next largest volume, account for 17% of all wastewater generated by the TECI, while 13% of the total volume of wastewater generated is divided among the remaining nine facility types.

Approximately 1.3 billion gallons of wastewater from interior cleaning operations is generated annually, as shown in Table 6-1. Truck/chemical facilities account for 56% of the total TEC wastewater volume, while truck/food facilities account for 19% of the total TEC wastewater volume. These percentages differ significantly from those based on wastewater generation volume. These differences indicate that truck/chemical facilities generate the majority of their wastewater from cleaning the interiors of tanks, while truck/food facilities generate the majority of their wastewater from cleaning tank exteriors and other processes.

Table 6-2 provides a more detailed analysis of the average volume of TEC wastewater generated per tank cleaning by commodity type and tank type. Truck tank, rail tankcar, tank barge, truck hopper, rail hopper, barge hopper, intermediate bulk container (IBC), and intermodal tank container (ITC) are the eight major tank types listed. In general, the tank capacity decreases in the following order by tank type: tank barge, barge hopper, rail tank, rail hopper, truck tank, truck hopper, ITC, and IBC. This decrease in tank size corresponds to a decrease in the amount of wastewater generated per tank cleaning. The volume of wastewater generated per tank cleaning for tank trucks is relatively similar for all commodity groups except for the Latex, Rubber, and Resins Group; the Chemical Products Group; and the Hazardous Waste Group. Facility personnel at facilities visited during engineering site visits and sampling episodes indicated that resins are the most difficult commodity to clean. Chemical products such as water treatment chemicals were also identified as difficult commodities to clean by facility personnel.

6.2 Sources of Wastewater

EPA has identified the following operations as primary sources of wastewater within the TECI:

- Tank interior cleaning;
- Tank exterior cleaning;
- Boiler blowdown;
- Tank hydrotesting;
- Safety equipment cleaning; and
- TEC-contaminated stormwater.

Tank interior cleaning wastewater includes water and steam condensate generated by tank cleaning operations, prerinse solutions, chemical cleaning solutions, and final rinse solutions. Tank exterior cleaning wastewater includes water and cleaning solutions generated by tank exterior cleaning operations. Boiler blowdown is wastewater generated during maintenance of on-site boilers used to heat tank cleaning solutions and rinses and to generate steam. Tank hydrotesting (i.e., hydrostatic pressure testing) is performed by completely filling the tank with water and applying a pressure of at least 150% of the maximum allowable working pressure. The water is then typically discharged as a waste stream. Wastewater is also generated by cleaning safety equipment. TEC-contaminated stormwater is commonly generated when rain water blows or runs into the tank cleaning bay (most cleaning bays are enclosed or covered). In addition, many wastewater treatment systems are not enclosed or covered resulting in generation of TEC-contaminated stormwater from these areas.

Additional wastewater sources reported in responses to the Detailed Questionnaire include air pollution control devices, maintenance and repair operations, laboratory wastewater, TEC noncontact cooling water, and flare condensate; however, these sources were reported by relatively few facilities and were generated in relatively small volumes.

Some facilities generate large volumes of non-TEC wastewater from food processing or other manufacturing operations and from non-TEC process equipment cleaning.

Other facilities accept wastewater for treatment on site such as TEC wastewater from other facilities or marine wastewater (e.g., bilge and ballast water). In these cases, wastewater generated off site may comprise 50% or more of the total wastewater volume generated.

Table 6-3 summarizes the average volume of wastewater generated per day for the six wastewater streams listed above. Average wastewater generation volumes were calculated based on data from all the facilities within a specific cargo group. If a facility did not report generating a wastestream, then that facility was assumed to generate zero gallons per day of that wastestream.

Tank interior cleaning wastewater comprises the largest wastewater stream generated by facilities in eight of the eleven facility types (data for some facilities is not shown to protect data confidentiality). For the remaining three facility types (rail/chemical, truck/petroleum, and rail/food), either tank hydrotesting wastewater or tank exterior cleaning wastewater comprise the largest wastewater stream.

Table 6-4 presents the total volume of wastewater generated per day by wastewater stream type and facility type. This value is obtained by multiplying the average volume of wastewater generated per facility per day (Table 6-3) by the total number of facilities within each respective facility type. Truck/chemical and truck/food facilities generate the largest volumes of interior wastewater and exterior wastewater because the largest number of tanks are cleaned by facilities in these facility types.

Although barge/hopper and barge/chemical & petroleum facilities generate the largest volume of TEC interior cleaning wastewater per facility as shown in Table 6-3, the total volume of wastewater generated by these two facility types is significantly less than that generated by truck/chemical and truck/food facilities. Although barge cleaning generates significantly more wastewater per tank cleaning than truck cleaning, the total number of tank trucks cleaned is much greater than the total number of tank barges cleaned.

6.3 Wastewater Discharge Practices

EPA estimates that 692 facilities discharge TEC wastewater either directly or indirectly. Table 6-5 summarizes the TECI discharge status by facility type. Approximately 97% of the discharging facilities discharge wastewater indirectly, while only 3% discharge wastewater directly. However, the majority of barge (tank and closed-top hopper) facilities (69%) discharge directly to U.S. surface waters because these facilities are usually located on major waterways. In addition, subsequent to 1994, the basis year of the detailed questionnaire, EPA learned of 4 barge/chemical and petroleum facilities that changed discharge status from direct to indirect. Where possible, EPA's analyses reflect this change. EPA has identified direct discharging facilities in addition to those shown in Table 6-5 (see Section 9.1.2); however, EPA has not identified any direct discharging facilities of the following five facility types: truck/petroleum, rail/petroleum, rail/food, truck/hopper, and rail/hopper.

Table 6-6 summarizes the total annual volume of wastewater discharged by the TECI. Approximately 2.2 billion gallons of wastewater is discharged annually by TEC facilities. This volume includes all wastewater sources such as TEC and non-TEC wastewaters, but excludes wastewaters that are not commingled with TEC wastewater such as sanitary wastewater and noncontaminated stormwater. Truck/food facilities account for 41% of this volume, due to the large number of tanks cleaned, relatively greater use of exterior cleaning as part of the routine tank cleaning operations, and wastewater generated by food processing operations at many truck/food facilities. Truck/chemical facilities, having the next largest volume, account for 39% of all wastewater generated by the TECI, while 20% of the total volume of wastewater generated is divided among the remaining nine facility groups.

EPA estimates that 547 facilities generate TEC wastewater but do not discharge wastewater directly to surface waters or indirectly to POTWs. The majority of these facilities achieve zero discharge of TEC wastewater by hauling the wastewater to a treatment, storage, and disposal facility (TSDF), ballast water treatment facility, privately owned treatment works, or centralized waste treatment (CWT) facility, or disposing of the wastewater by land application, land disposal, or evaporation. An estimated 44 TEC facilities achieve zero discharge of TEC wastewater by recycling or reusing 100% of TEC wastewater.

6.4 Water Reuse and Recycling

Water reuse and recycle activities commonly performed by discharging and zero discharge facilities include:

- Recirculation of cleaning solutions, including chemical cleaning solutions and water washes;
- Reuse of final rinse wastewater as initial rinse water; and
- Reuse of treated TEC wastewater as source water for TEC operations.

Other water reuse and recycle activities reported in responses to the Detailed Questionnaire include:

- Reuse of hydrotest wastewater as source water for TEC operations;
- Use of TEC contaminated stormwater as source water for TEC operations; and
- Reuse of final tank rinse wastewater as cleaning solution “make-up” water.

Additional information concerning water conservation and water recycle and reuse technologies applicable to the TECI is included in Section 7.2.

Approximately 10% of facilities, including discharging and zero discharging facilities, reuse all or part of treated TEC wastewater as source water for TEC operations. The majority of these facilities are zero discharging facilities, as shown in Table 6-7. The highest percentage of facilities that reuse wastewater in TEC operations are the truck/petroleum facilities.

For these facilities, 52 zero dischargers out of the total 104 truck/petroleum facilities reuse TEC wastewater as source water for TEC operations.

Wastewater streams that are recycled or reused for TEC operations include tank interior cleaning wastewater and hydrotesting wastewater. Hydrotesting wastewater is typically clean and does not require extensive treatment prior to recycle or reuse. Tank interior cleaning wastewater generated by truck/petroleum or rail/petroleum facilities can typically be reused for cleaning after treatment by simple oil/water separation. Tank interior cleaning wastewater generated by facilities cleaning chemical cargos generally requires more extensive treatment prior to reuse as source water in TEC operations. Accordingly, few facilities that clean chemical cargos reuse treated TEC wastewater as source water for TEC operations. Finally, sanitation requirements at many food grade facilities preclude the reuse of TEC wastewater as source water for TEC operations at these facilities.

The Agency analyzed wastewater generation, treatment, and discharge diagrams submitted in response to the Detailed Questionnaire to evaluate typical TEC wastewater management practices and common wastewater recycle and reuse practices. Figure 6-1 illustrates common wastewater management practices. The figure shows wastewater recycling that was reported to be performed by one or more facilities within the Detailed Questionnaire sample population. Review of the water flow diagrams submitted by facilities in responses to the Detailed Questionnaire resulted in the following observations:

- Facilities that recycle one wastewater stream type do not necessarily recycle additional wastewater stream types;
- Facilities that recycle wastewater streams generally segregate these streams for treatment and recycle; and
- Wastewater stream recycle and reuse activities performed are dependent upon the type of cargo cleaned.

6.5 Wastewater Characterization

EPA conducted a study of TECI wastewaters to determine the presence or absence of priority, conventional, and nonconventional pollutant parameters. Priority pollutants parameters are defined in Section 307(a)(1) of the Clean Water Act (CWA). The list of priority pollutant parameters, presented in Table 6-8, consists of 126 specific priority pollutants listed in 40 CFR Part 423, Appendix A. Section 301(b)(2) of the CWA obligates EPA to regulate priority pollutants if they are determined to be present at significant concentrations and it is technically and economically feasible. Section 304(a)(4) of the CWA defines conventional pollutant parameters, which include biochemical oxygen demand (BOD_5), total suspended solids (TSS), pH, fecal coliform, and any additional pollutants defined by the administrator as conventional. The administrator designated oil and grease (referred to as hexane extractable material or HEM) as an additional conventional pollutant on July 30, 1979 (44 FR 44501). These pollutant parameters are subject to regulation as specified in Sections 304(b)(1)(A), 304(a)(4), 301(b)(2)(E), and 306 of the CWA. Nonconventional pollutant parameters are those that are neither priority nor conventional pollutant parameters. Sections 301(b)(2)(F) and 301(g) of the CWA give EPA the authority to regulate nonconventional pollutant parameters, as appropriate, based on technical and economic considerations.

As discussed in Section 3.4, EPA conducted 20 sampling episodes at 18 facilities representative of the variety of facilities in the TECI (2 facilities were sampled twice). As part of this sampling program, EPA routinely analyzed wastewater samples for 4 conventional, 125 priority, and 348 nonconventional pollutant parameters, for a total of 477 pollutants analyzed. The nonconventional pollutants include organics, metals, pesticides, herbicides, dioxins, furans, and classical wet chemistry parameters (classical pollutants) that do not appear on the list of conventional or priority pollutants.

Subsequent to sampling, wastewater characterization data from four facilities were determined to not represent TEC wastewater, either because the facility was covered by another effluent guideline or because the sampled waste stream was determined to not represent TEC wastewater. Tables 6-9 through 6-16 present available wastewater characterization data by tank and cargo type cleaned. Data are available for the following:

- Truck/chemical facilities (Table 6-9);
- Rail/chemical facilities (Table 6-10);
- Barge/chemical & petroleum facilities (Table 6-11);
- Truck/food facilities (Table 6-12);
- Rail/food facilities (Table 6-13);
- Barge/food facilities (Table 6-14);
- Truck/petroleum facilities (Table 6-15); and
- Barge/hopper facilities (Table 6-16).

Raw wastewater characterization data for truck/hopper, rail/hopper, and rail/petroleum facilities were not collected during EPA's sampling program. EPA believes that characterization data from barge/hopper facilities represent truck/hopper and rail/hopper facilities since these facilities clean similar cargos; however, the volume of TEC wastewater generated during tank cleaning differs significantly among these facilities. EPA believes that characterization data from truck/petroleum facilities represent rail/petroleum facilities since these facilities also clean similar cargos.

However, in its analysis of the industry, EPA sampled one truck/petroleum facility. This facility treated only final rinse wastewater on site. Initial rinses and other TEC wastewaters were contract hauled for off-site treatment and were consequently not included in the sampling performed by EPA. Therefore, EPA did not use the data collected from this facility in further analyses because the data are not considered to be representative of the Truck/Chemical & Petroleum and Rail/Chemical & Petroleum Subcategories.

Tables 6-9 through 6-16 also present a statistical summary of the raw wastewater characterization data, including the mean, minimum, and maximum concentration values for each pollutant or parameter detected at least once in any raw wastewater characterization sample. For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration. The methodology used to calculate the mean concentration involved first calculating a mean concentration for each facility characterized and then calculating a subcategory mean concentration using applicable mean facility concentrations. In addition, for those samples in which individual pollutants were not detected, the sample detection limit is reported as the minimum concentration. Also listed in these tables is the number of times each pollutant or parameter was analyzed and detected in raw wastewater samples.

The summaries shown in Table 6-17 are derived from Tables 6-9 through 6-16. As expected, facilities cleaning chemical cargos have the highest number of priority pollutants detected. In addition, the range of concentrations for the classical pollutants is highest for barge/chemical & petroleum and truck/chemical facilities.

6.6 Pollutants of Interest

As discussed in Section 5.2, EPA subcategorized the TECI into 7 subcategories:

- Truck/Chemical & Petroleum Subcategory;
- Rail/Chemical & Petroleum Subcategory;
- Barge/Chemical & Petroleum Subcategory;
- Food Subcategory;
- Truck/Hopper Subcategory;
- Rail/Hopper Subcategory; and
- Barge/Hopper Subcategory.

Using the raw wastewater characterization data presented in Tables 6-9 through 6-16, EPA determined those pollutants commonly present in TECI wastewater for each subcategory and identified these pollutants as “pollutants of interest.” EPA considered a separate list of pollutants of interest for each subcategory. EPA considered the following two general criteria to identify pollutants of interest:

1. The frequency of detection in subcategory wastewater characterization samples; and

2. The average raw wastewater concentration at those facilities sampled for treatment performance.

The first criterion indicates that the presence of the pollutant is representative of the subcategory, rather than an isolated occurrence. The second criterion ensures that the pollutant was present at treatable levels where EPA evaluated treatment performance. Application of these two general criteria is described in Sections 6.6.1 through 6.6.3.

If wastewater characterization samples were collected at two or more facilities within a subcategory, then pollutants detected at least two times in wastewater characterization samples were considered as pollutants of interest for that subcategory. If wastewater characterization samples were collected at only one facility within a subcategory, then only one detect was required for consideration as a pollutant of interest. Where EPA sampling data show that a pollutant concentration is below the detection limit at all sampled facilities within a subcategory, that pollutant is excluded from consideration as a pollutant of interest in that subcategory.

EPA considered an average pollutant concentration of at least five times the pollutant method detection limit to be a treatable level for all pollutants. To determine the average pollutant concentration within each subcategory, EPA averaged both the detected and the nondetected concentrations (nondetected concentrations were assumed to be equal to the pollutant detection limit). For subcategories with treatment performance data from more than one facility, pollutants present at treatable levels in the wastewater of at least one facility were considered pollutants of interest for that subcategory. Table 6-18 shows pollutants of interest by subcategory.

6.6.1 Truck/Chemical & Petroleum, Rail/Chemical & Petroleum, and Barge/Chemical & Petroleum Subcategories

Wastewater characterization samples were analyzed for all 477 pollutants for these subcategories. As discussed in Section 5.2, facilities that clean petroleum and/or chemical cargos are subcategorized by tank type (e.g., Truck/Chemical & Petroleum). However, for the purpose of determining pollutants of interest for the Truck/Chemical & Petroleum Subcategory, EPA excluded wastewater characterization data from the truck/petroleum facilities for the reasons discussed in Section 6.5. Therefore, raw wastewater characterization data from only truck/chemical facilities are used to identify pollutants of interest in the Truck/Chemical & Petroleum Subcategory.

The same selection criteria were applied separately to the analytical data available for the Truck/Chemical & Petroleum, Rail/Chemical & Petroleum, and Barge/Chemical & Petroleum Subcategories to identify pollutants of interest. These include:

- The pollutant was detected in at least two TEC wastewater characterization samples.
- The average raw wastewater concentration was at least five times the method detection limit from at least one facility sampled for treatment performance.

EPA conducted a rigorous analytical data review of all detects in Sampling Episode 4676 and 4677 (Truck/Chemical & Petroleum Subcategory). Based on this review, EPA determined that the presence of disulfoton and EPN are questionable in Truck/Chemical & Petroleum Subcategory raw wastewater. These pesticides are not further considered in EPA's analyses for the Truck/Chemical & Petroleum Subcategory.

6.6.2 Food Subcategory

Wastewater characterization samples were analyzed for all 477 pollutants. Available characterization data for the Food Subcategory include five days of sampling at a barge/food facility, one day of sampling at a truck/food facility, and one day of sampling at a rail/food facility.

EPA used wastewater treatment system performance data collected at one barge/food facility to represent the Food Subcategory. Samples collected at this one facility were analyzed for 190 pollutants including all 176 semivolatile organics and 14 classical pollutants. Volatile organics, pesticides, herbicides, dioxins, furans, metals, and six classical pollutants (adsorbable organic halides, total cyanide, amenable cyanide, surfactants, total sulfide, and volatile residue) were not analyzed because these analytes were not detected at significant levels in wastewater characterization samples. The following selection criteria were applied to identify pollutants of interest for the Food Subcategory. These include:

- The pollutant was detected in at least one TEC wastewater characterization sample at any Food facility.
- The average raw wastewater concentration was at least five times the method detection limit at the facility sampled for treatment performance.

6.6.3 Truck/Hopper, Rail/Hopper, and Barge/Hopper Subcategories

The Agency used the sampling data collected at one barge/hopper facility to represent all three hopper subcategories. Samples collected during this sampling episode were analyzed for 453 pollutants, 24 fewer than the usual 477 pollutants. These 24 pollutants include the 17 dioxins and furans, 5 classical wet chemistry parameters (adsorbable organic halides, surfactants, total phenols, total sulfide, and volatile residue), and 2 volatile organics (m-xylene and o- + p-xylene). Except for xylenes, these pollutants were not analyzed because they were not expected to be present in TEC wastewater based on an assessment of the cargos cleaned and the cleaning processes used by facilities in these subcategories. M-xylene and o- + p-xylene were not analyzed because the laboratory inadvertently analyzed for m- + p-xylene and o-xylene instead, both of which were not detected. The same selection criteria were applied to the Truck/Hopper, Rail/Hopper, and Barge/Hopper Subcategories to identify pollutants of interest. These include:

- The pollutant was detected in the single TEC wastewater characterization sample.
- The average raw wastewater concentration was at least five times the method detection limit at the facility sampled for treatment performance.

Table 6-1

Estimates of Total Annual Volume of Wastewater Generated by Facility Type – Discharging Facilities Only

Facility Type	Total Wastewater Generated		Wastewater Generated from Interior Cleaning Operations	
	Amount (gal/yr)	**Percentage of Industry Total (%)**	**Amount (gal/yr)**	**Percentage of Industry Total (%)**
Truck/Chemical	929,000,000	17	716,000,000	56
Rail/Chemical	262,000,000	5	91,900,000	7
Barge/Chemical & Petroleum	194,000,000	4	94,100,000	7
Truck/Petroleum	35,400,000	<1	2,500,000	<1
Rail/Petroleum	2,800	<<1	2,830	<<1
Truck/Food	3,850,000,000	70	245,000,000	19
Rail/Food	88,200,000	2	6,920,000	<1
Barge/Food	21,700	<<1	21,700	<<1
Truck/Hopper	23,900,000	<1	14,300,000	1
Rail/Hopper	208,000	<<1	17,500	<<1
Barge/Hopper	112,000,000	2	103,000,000	8
TOTAL (a)	**5,490,000,000**	**100**	**1,270,000,000**	**100**

(a) Differences occur due to rounding.

Table 6-2

Average Volume of Interior Cleaning Wastewater Generated per Tank Cleaning by Cargo Group and Tank Type – Discharging Facilities Only

Cargo Group	Average Volume of Interior Cleaning Wastewater Generated (gallons/tank)							
	Truck Tank	Rail Tank	Tank Barge	Truck Hopper	Rail Hopper	Barge Hopper	Intermediate Bulk Container	Intermodal Tank Container
Food Grade Products	360	1,200	19,000	520	1,800	17,000	NC	430
Petroleum and Coal Products	410	990	13,000	(a)	(a)	(a)	87	430
Latex, Rubber, and Resins	610	1,600	(a)	(a)	(a)	NC	50	230
Soaps and Detergents	440	620	NC	(a)	(a)	NC	(a)	550
Biodegradable Organic Chemicals	330	1,200	9,100	(a)	(a)	NC	(a)	(a)
Refractory Organic Chemicals	400	1,200	11,000	NC	NC	NC	NC	NC
Inorganic Chemicals	410	1,300	12,000	(a)	(a)	NC	(a)	NC
Agricultural Chemicals and Fertilizers	330	1,700	3,600	(a)	(a)	850	NC	NC
Chemical Products	640	1,700	3,700	NC	(a)	NC	(a)	810
Hazardous Waste	170	NC	NC	NC	NC	NC	NC	NC
Nonhazardous Waste	280	530	(a)	NC	NC	NC	NC	NC
Dry Bulk Commodities or Cargos	580	(a)	NC	470	1,900	(a)	NC	NC

(a) Not disclosed to prevent compromising confidential business information.
NC - Not characterized by the Detailed Questionnaire sample population.

Table 6-3

Average Volume of Wastewater Generated per Facility per Day by Wastewater Stream Type and Facility Type – Discharging Facilities Only

Facility Type	TEC Interior Cleaning (gallons/day)	TEC Exterior Washing (gallons/day)	Boiler Blowdown (gallons/day)	Hydrotesting Wastewater (gallons/day)	Safety Equipment Rinsate (gallons/day)	TEC-Contaminated Stormwater (gallons/day)
Truck/Chemical	8,400	1,200	15	270	7.8	18
Rail/Chemical	8,700	870	250	8,900	4.8	240
Barge/Chemical & Petroleum	20,000	(a)	(a)	NC	(a)	(a)
Truck/Petroleum	420	37	NC	1,800	NC	(a)
Rail/Petroleum	(a)	NC	NC	NC	NC	NC
Truck/Food	4,600	640	(a)	NC	NC	(a)
Rail/Food	(a)	(a)	NC	NC	NC	NC
Barge/Food	(a)	NC	NC	NC	NC	NC
Truck/Hopper	1,400	500	NC	NC	NC	NC
Rail/Hopper	(a)	NC	NC	(a)	(a)	NC
Barge/Hopper	34,000	NC	NC	NC	NC	(a)

(a) Not disclosed to prevent compromising confidential business information.
NC - Not characterized by the Detailed Questionnaire sample population.

Table 6-4

Total Volume of Wastewater Generated per Day by Wastewater Stream Type and Facility Type – Discharging Facilities Only

Facility Type	TEC Interior Cleaning (gallons/day)	TEC Exterior Washing (gallons/day)	Boiler Blowdown (gallons/day)	Hydrotesting Wastewater (gallons/day)	Safety Equipment Rinsate (gallons/day)	TEC-Contaminated Stormwater (gallons/day)
Truck/Chemical	2,400,000	340,000	4,400	77,000	2,200	5,300
Rail/Chemical	330,000	33,000	9,400	340,000	180	9100
Barge/Chemical & Petroleum	300,000	(a)	(a)	NC	(a)	(a)
Truck/Petroleum	15,000	1,300	NC	62,000	NC	(a)
Rail/Petroleum	(a)	NC	NC	NC	NC	NC
Truck/Food	800,000	110,000	(a)	NC	NC	(a)
Rail/Food	(a)	(a)	NC	NC	NC	NC
Barge/Food	(a)	NC	NC	NC	NC	NC
Truck/Hopper	46,000	17,000	NC	NC	NC	NC
Rail/Hopper	(a)	NC	NC	(a)	(a)	NC
Barge/Hopper	430,000	NC	NC	NC	NC	(a)

(a) Not disclosed to prevent compromising confidential business information.
NC - Not characterized by the Detailed Questionnaire sample population.

Table 6-5

Discharge Status by Facility Type

Facility Type	Indirect Discharge		Direct Discharge	
	Number of Facilities	Percentage of Industry Total (%)	Number of Facilities	Percentage of Industry Total (%)
Truck/Chemical	288	43	0	0
Rail/Chemical	38	6	0	0
Barge/Chemical & Petroleum (a)	5	<1	10	53
Truck/Petroleum	34	5	0	0
Rail/Petroleum	3	<1	0	0
Truck/Food	173	26	0	0
Rail/Food	86	13	0	0
Barge/Food	2	<1	0	0
Truck/Hopper	34	5	0	0
Rail/Hopper	5	<1	0	0
Barge/Hopper	3	<1	9	47
TOTAL (b)	**673**	**100**	**19**	**100**

(a) Subsequent to 1994, the basis year of the detailed questionnaire, EPA learned of 4 barge/chemical and petroleum facilities that changed discharge status from direct to indirect.
(b) Differences occur due to rounding.

Table 6-6

Estimates of Total Annual Volume of Wastewater Discharged By Facility Type and Discharge Status

Facility Type	Discharge Status	Total Interior Cleaning Wastewater Discharged		Total Commingled Wastewater Discharged	
		Amount (gal/yr)	Percentage of Industry Total (%)	Amount (gal/yr)	Percentage of Industry Total (%)
Truck/Chemical	Indirect	708,000,000	57	845,000,000	39
Rail/Chemical	Indirect	91,300,000	7	130,000,000	6
Barge/Chemical & Petroleum	Direct	30,300,000	2	42,800,000	2
Barge/Chemical & Petroleum	Indirect	28,100,000	2	28,700,000	1
Truck/Petroleum	Indirect	2,500,000	<1	3,100,000	<1
Rail/Petroleum	Indirect	2,830	<<1	2,830	<<1
Truck/Food	Indirect	243,000,000	20	889,000,000	41
Rail/Food	Indirect	19,500,000	2	131,000,000	6
Barge/Food	Indirect	21,700	<<1	21,700	<<1
Truck/Hopper	Indirect	14,300,000	1	19,500,000	<1
Rail/Hopper	Indirect	17,400	<<1	80,200	<<1
Barge/Hopper	Direct	100,000,000	8	100,000,000	5
Barge/Hopper	Indirect	2,610,000	<1	2,610,000	<1
TOTAL (a)		**1,240,000,000**	**100**	**2,190,000,000**	**100**

(a) Differences occur due to rounding.

Table 6-7

Number of Facilities That Reuse All or Part of TEC Wastewater as Source Water for TEC Operations

Facility Type	Number of Facilities that Reuse TEC Wastewater		Total Number of Discharging and Zero Discharge Facilities
	Discharging Facilities	Zero Discharge Facilities	
Truck/Chemical	14	33	556
Rail/Chemical	1	15	67
Barge/Chemical & Petroleum	3	1	31
Truck/Petroleum	0	52	104
Rail/Petroleum	0	1	4
Truck/Food	0	0	318
Rail/Food	0	0	86
Barge/Food	0	0	2
Truck/Hopper	5	0	39
Rail/Hopper	0	0	5
Barge/Hopper	0	0	14

Table 6-8
Priority Pollutant List (a)

1 Acenaphthene	66 Bis (2-ethylhexyl) Phthalate
2 Acrolein	67 Butyl Benzyl Phthalate
3 Acrylonitrile	68 Di-n-butyl Phthalate
4 Benzene	69 Di-n-octyl Phthalate
5 Benzidine	70 Diethyl Phthalate
6 Carbon Tetrachloride (Tetrachloromethane)	71 Dimethyl Phthalate
7 Chlorobenzene	72 Benzo(a)anthracene (1,2-Benzanthracene)
8 1,2,4-Trichlorobenzene	73 Benzo(a)pyrene (3,4-Benzopyrene)
9 Hexachlorobenzene	74 Benzo(b)fluoranthene (3,4-Benzo fluoranthene)
10 1,2-Dichloroethane	75 Benzo(k)fluoranthene (11,12-Benzofluoranthene)
11 1,1,1-Trichloroethane	76 Chrysene
12 Hexachloroethane	77 Acenaphthylene
13 1,1-Dichloroethane	78 Anthracene
14 1,1,2-Trichloroethane	79 Benzo(ghi)perylene (1,12-Benzoperylene)
15 1,1,2,2-Tetrachloroethane	80 Fluorene
16 Chloroethane	81 Phenanthrene
17 Removed	82 Dibenzo(a,h)anthracene (1,2,5,6-Dibenzanthracene)
18 Bis (2-chloroethyl) Ether	83 Indeno(1,2,3-cd)pyrene (2,3-o-Phenylenepyrene)
19 2-Chloroethyl Vinyl Ether (mixed)	84 Pyrene
20 2-Chloronaphthalene	85 Tetrachloroethylene (Tetrachloroethene)
21 2,4,6-Trichlorophenol	86 Toluene
22 Parachlorometa Cresol (4-Chloro-3-Methylphenol)	87 Trichloroethylene (Trichloroethene)
23 Chloroform (Trichloromethane)	88 Vinyl Chloride (Chloroethylene)
24 2-Chlorophenol	89 Aldrin
25 1,2-Dichlorobenzene	90 Dieldrin
26 1,3-Dichlorobenzene	91 Chlordane (Technical Mixture & Metabolites)
27 1,4-Dichlorobenzene	92 4,4'-DDT (p,p'-DDT)
28 3,3'-Dichlorobenzidine	93 4,4'-DDE (p,p'-DDX)
29 1,1-Dichloroethene	94 4,4'-DDD (p,p'-TDE)
30 1,2-Trans-Dichloroethene	95 Alpha-endosulfan
31 2,4-Dichlorophenol	96 Beta-endosulfan
32 1,2-Dichloropropane	97 Endosulfan Sulfate
33 1,3-Dichloropropylene (Trans-1,3-Dichloropropene)	98 Endrin
34 2,4-Dimethylphenol	99 Endrin Aldehyde
35 2,4-Dinitrotoluene	100 Heptachlor
36 2,6-Dinitrotoluene	101 Heptachlor Epoxide
37 1,2-Diphenylhydrazine	102 Alpha-BHC
38 Ethylbenzene	103 Beta-BHC
39 Fluoranthene	104 Gamma-BHC (Lindane)
40 4-Chlorophenyl Phenyl Ether	105 Delta-BHC
41 4-Bromophenyl Phenyl Ether	106 PCB-1242 (Arochlor 1242)
42 Bis (2-chloroisopropyl) Ether	107 PCB-1254 (Arochlor 1254)
43 Bis (2-chloroethoxy) Methane	108 PCB-1221 (Arochlor 1221)
44 Methylene Chloride (Dichloromethane)	109 PCB-1232 (Arochlor 1232)
45 Methyl Chloride (Chloromethane)	110 PCB-1248 (Arochlor 1248)
46 Methyl Bromide (Bromomethane)	111 PCB-1260 (Arochlor 1260)
47 Bromoform (Tribromomethane)	112 PCB-1016 (Arochlor 1016)
48 Dichlorobromomethane (Bromodichloromethane)	113 Toxaphene
49 Removed	114 Antimony (total)
50 Removed	115 Arsenic (total)
51 Chlorodibromomethane (Dibromochloromethane)	116 Asbestos (fibrous)
52 Hexachlorobutadiene	117 Beryllium (total)
53 Hexachlorocyclopentadiene	118 Cadmium (total)
54 Isophorone	119 Chromium (total)
55 Naphthalene	120 Copper (total)
56 Nitrobenzene	121 Cyanide (total)
57 2-Nitrophenol	122 Lead (total)
58 4-Nitrophenol	123 Mercury (total)
59 2,4-Dinitrophenol	124 Nickel (total)
60 4,6-Dinitro-o-Cresol (Phenol, 2-methyl-4,6-dinitro)	125 Selenium (total)
61 N-Nitrosodimethylamine	126 Silver (total)
62 N-Nitrosodiphenylamine	127 Thallium (total)
63 N-Nitrosodi-n-propylamine (Di-n-propylnitrosamine)	128 Zinc (total)
64 Pentachlorophenol	129 2,3,7,8-Tetrachlorodibenzo-p-Dioxin
65 Phenol	

Source: Clean Water Act

(a) Priority pollutants are numbered 1 through 129 but include 126 pollutants since EPA removed three pollutants from the list (Numbers 17, 49, and 50).

Table 6-9

Summary of Raw Wastewater Characterization Data for Truck/Chemical Facilities

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Volatile Organics							
P011	1,1,1-Trichloroethane	µg/L	710	10	2,700	9	10
P013	1,1-Dichloroethane	µg/L	12	9.9	36	2	10
P029	1,1-Dichloroethene	µg/L	14	10	40	2	10
	1,2-Dibromoethane	µg/L	17	10	86	2	10
P010	1,2-Dichloroethane	µg/L	400	10	1,700	4	10
P032	1,2-Dichloropropane	µg/L	11	9.9	19	1	10
	1,4-Dioxane	µg/L	19	9.9	150	1	10
	Acetone	µg/L	24,000	57	67,000	10	10
P004	Benzene	µg/L	35	10	270	3	10
P048	Bromodichloromethane	µg/L	10	9.9	12	1	10
P007	Chlorobenzene	µg/L	16	10	29	4	10
P023	Chloroform	µg/L	65	10	420	6	10
	Diethyl Ether	µg/L	110	50	900	1	10
P038	Ethylbenzene	µg/L	440	10	3,900	6	10
	m-Xylene	µg/L	1,700	10	7,100	6	10
	Methyl Ethyl Ketone	µg/L	5,200	50	28,000	6	10
	Methyl Isobutyl Ketone	µg/L	1,600	50	8,200	7	10
P044	Methylene Chloride	µg/L	12,000	29	63,000	10	10
	o- + p-Xylene	µg/L	860	10	3,600	6	10
P085	Tetrachloroethene	µg/L	1,100	10	6,500	8	10
P006	Tetrachloromethane	µg/L	14	9.9	49	1	10

Table 6-9 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P086	Toluene	µg/L	1,600	10	7,000	7	10
P047	Tribromomethane	µg/L	10	9.9	14	1	10
P087	Trichloroethene	µg/L	26	10	81	4	10
Semivolatile Organics							
P025	1,2-Dichlorobenzene	µg/L	190	10	1,000	2	10
	1-Methylphenanthrene	µg/L	140	10	1,000	2	10
	2,3-Dichloroaniline	µg/L	3,600	10	34,000	2	10
P021	2,4,6-Trichlorophenol	µg/L	180	10	1,500	2	10
P031	2,4-Dichlorophenol	µg/L	57	10	160	2	10
	2,6-Dichlorophenol	µg/L	56	10	160	1	10
P024	2-Chlorophenol	µg/L	67	10	160	3	10
	2-Isopropylnaphthalene	µg/L	240	10	1,000	3	10
	2-Methylnaphthalene	µg/L	150	10	1,000	7	10
P057	2-Nitrophenol	µg/L	110	20	320	1	10
	3,6-Dimethylphenanthrene	µg/L	160	10	1,000	2	10
P058	4-Nitrophenol	µg/L	270	50	800	1	10
P001	Acenaphthene	µg/L	130	10	1,000	1	10
	alpha-Terpineol	µg/L	340	10	2,000	4	10
	Aniline	µg/L	130	10	1,000	1	10
	Benzoic Acid	µg/L	24,000	1,500	110,000	10	10
	Benzyl Alcohol	µg/L	410	28	1,900	9	10
	Biphenyl	µg/L	140	10	1,000	2	10
P066	Bis (2-ethylhexyl) Phthalate	µg/L	900	12	4,200	9	10
P069	Di-n-Octyl Phthalate	µg/L	350	10	2,200	5	10
P063	Di-n-Propylnitrosamine	µg/L	270	20	2,000	1	10

Table 6-9 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Dimethyl Sulfone	µg/L	150	10	1,000	2	10
	Diphenylamine	µg/L	140	10	1,000	1	10
P080	Fluorene	µg/L	140	10	1,000	1	10
	Hexanoic Acid	µg/L	77	10	200	2	10
P054	Isophorone	µg/L	140	10	1,000	1	10
	n-Decane	µg/L	350	10	1,100	2	10
	n-Docosane	µg/L	330	10	2,600	8	10
	n-Dodecane	µg/L	1,100	10	3,200	4	10
	n-Eicosane	µg/L	410	10	1,900	8	10
	n-Hexacosane	µg/L	810	10	7,600	8	10
	n-Hexadecane	µg/L	640	10	1,800	8	10
P062	n-Nitrosodiphenylamine	µg/L	270	20	2,000	1	10
	n-Octacosane	µg/L	940	10	9,000	6	10
	n-Octadecane	µg/L	450	10	1,700	8	10
	n-Tetracosane	µg/L	640	10	5,400	9	10
	n-Tetradecane	µg/L	560	10	2,100	7	10
	n-Triacontane	µg/L	1,200	10	11,000	3	10
P055	Naphthalene	µg/L	330	10	1,000	7	10
	o-Cresol	µg/L	160	10	1,000	2	10
	p-Cresol	µg/L	130	10	670	4	10
	p-Cymene	µg/L	150	10	1,000	2	10
P081	Phenanthrene	µg/L	180	10	1,000	2	10
P065	Phenol	µg/L	2,000	100	6,400	9	10
	Styrene	µg/L	3,300	10	27,000	7	10
	Tripropyleneglycol Methyl Ether	µg/L	1,300	99	9,900	1	10

Table 6-9 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Phenoxy-Acid Herbicides							
	2,4,5-T	µg/L	0.85	0.20	4.4	4	10
	2,4,5-TP	µg/L	0.59	0.20	3.2	3	10
	2,4-D	µg/L	2.5	1.0	10	2	10
	2,4-DB (Butoxon)	µg/L	6.6	2.0	31	2	10
	Dalapon	µg/L	0.81	0.20	5.7	2	10
	Dichloroprop	µg/L	2.8	1.0	10	2	10
	Dinoseb	µg/L	2.3	0.50	18	3	10
	MCPA	µg/L	680	50	3,500	7	10
	MCPP	µg/L	130	50	740	1	10
	Picloram	µg/L	1.2	0.50	5.0	2	10
Organo-Phosphorous Pesticides							
	Azinphos Methyl	µg/L	4.4	1.0	22	3	10
	Demeton B	µg/L	5.4	2.0	35	1	10
	Diazinon	µg/L	3.9	2.0	16	2	10
	Dichlofenthion	µg/L	2.8	2.0	9.0	3	10
	Dimethoate	µg/L	2.3	1.0	6.8	1	10
	Ethion	µg/L	2.4	2.0	4.3	1	10
	Leptophos	µg/L	5.6	2.0	34	3	10
	Merphos	µg/L	2.5	2.0	5.4	1	10
	Methyl Chlorpyrifos	µg/L	3.3	2.0	14	1	10
	Methyl Parathion	µg/L	2.3	2.0	4.0	1	10
	Tetrachlorvinphos	µg/L	2.7	2.0	7.1	3	10
Organo-Halide Pesticides							
P094	4,4'-DDD	µg/L	0.59	0.20	2.0	1	10

Table 6-9 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P092	4,4'-DDT	µg/L	0.29	0.10	1.0	1	10
P103	beta-BHC	µg/L	0.35	0.10	1.0	3	10
	Bromoxynil Octanoate	µg/L	1.5	0.50	5.0	1	10
	Chlorobenzilate	µg/L	3.5	1.0	10	4	10
	Diallate A	µg/L	6.9	2.0	20	2	10
	Diallate B	µg/L	10	2.0	62	2	10
P090	Dieldrin (d)	µg/L	0.13	0.040	0.40	3	10
P096	Endosulfan II	µg/L	2.9	1.0	10	1	10
P097	Endosulfan Sulfate	µg/L	0.30	0.10	1.0	2	10
P099	Endrin Aldehyde	µg/L	3.3	0.10	15	2	10
P104	gamma-BHC	µg/L	0.20	0.050	0.50	2	10
P091	gamma-Chlordane	µg/L	0.16	0.050	0.50	1	10
	Nitrofen	µg/L	0.60	0.20	2.0	1	10
	Pentachloronitrobenzene (PCNB)	µg/L	7.9	0.050	77	3	10
	Propachlor	µg/L	2.3	0.10	11	1	10
	Simazine	µg/L	28	8.0	84	1	10
	Terbuthylazine	µg/L	15	5.0	50	1	10
Metals							
	Aluminum	µg/L	6,100	48	30,000	10	10
P114	Antimony	µg/L	57	3.4	240	6	10
P115	Arsenic	µg/L	15	4.6	28	9	10
	Barium	µg/L	530	73	1,200	10	10
P117	Beryllium	µg/L	0.92	0.30	1.4	2	10
	Bismuth	µg/L	110	0.10	650	1	10
	Boron	µg/L	4,700	140	26,000	10	10

Table 6-9 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P118	Cadmium	µg/L	18	1.0	49	9	10
	Calcium	µg/L	300,000	71,000	540,000	10	10
P119	Chromium	µg/L	2,400	3.1	19,000	9	10
	Cobalt	µg/L	85	6.0	330	8	10
P120	Copper	µg/L	1,100	40	9,200	10	10
	Dysprosium	µg/L	46	26	100	2	10
	Europium	µg/L	24	2.9	100	3	10
	Gadolinium	µg/L	98	28	300	2	10
	Gallium	µg/L	280	8.6	1,100	2	10
	Germanium	µg/L	200	72	500	3	10
	Gold	µg/L	68	11	200	3	10
	Hafnium	µg/L	160	1.0	500	1	10
	Hexavalent Chromium	mg/L	0.29	0.010	3.3	3	9
	Holmium	µg/L	140	0.50	500	1	10
	Iridium	µg/L	580	42	4,400	4	10
	Iron	µg/L	30,000	270	150,000	10	10
	Lanthanum	µg/L	35	0.10	100	1	10
P122	Lead	µg/L	25	2.8	76	3	10
	Lithium	µg/L	96	31	180	7	10
	Lutetium	µg/L	22	0.58	100	2	10
	Magnesium	µg/L	72,000	10,000	270,000	10	10
	Manganese	µg/L	800	2.3	6,300	10	10
P123	Mercury	µg/L	1.8	0.20	5.0	8	10
	Molybdenum	µg/L	100	18	370	10	10
	Neodymium	µg/L	52	0.50	200	1	10

Table 6-9 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P124	Nickel	µg/L	360	9.0	2,100	10	10
	Niobium	µg/L	170	32	500	6	10
	Osmium	µg/L	91	0.10	490	1	10
	Palladium	µg/L	190	0.50	500	1	10
	Phosphorus	µg/L	42,000	1,300	190,000	8	8
	Platinum	µg/L	570	66	3,700	5	10
	Potassium	µg/L	19,000	6,100	34,000	8	8
	Praseodymium	µg/L	140	1.0	500	2	10
	Rhenium	µg/L	160	19	500	3	10
	Rhodium	µg/L	1,200	1.0	6,700	4	10
	Ruthenium	µg/L	320	62	590	6	10
	Samarium	µg/L	150	0.50	500	1	10
	Scandium	µg/L	21	0.10	100	4	10
P125	Selenium	µg/L	11	1.0	23	3	10
	Silicon	µg/L	14,000	2,800	51,000	9	10
P126	Silver	µg/L	3.5	2.2	6.4	3	10
	Sodium	µg/L	1,000,000	140,000	2,800,000	10	10
	Strontium	µg/L	2,300	140	5,500	10	10
	Sulfur	µg/L	360,000	68,000	780,000	8	8
	Tantalum	µg/L	200	0.50	500	4	10
	Tellurium	µg/L	270	1.0	1,000	3	10
	Terbium	µg/L	140	8.3	500	2	10
P127	Thallium	µg/L	3.7	1.0	24	2	10
	Thorium	µg/L	170	1.0	500	1	10
	Thulium	µg/L	110	0.50	500	1	10

Table 6-9 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Tin	µg/L	12,000	23	85,000	7	10
	Titanium	µg/L	190	6.1	1,000	10	10
	Tungsten	µg/L	220	1.0	500	3	10
	Uranium	µg/L	610	1.0	1,000	1	10
	Vanadium	µg/L	31	1.9	150	7	10
	Ytterbium	µg/L	22	0.10	100	4	10
	Yttrium	µg/L	2.1	0.30	5.0	1	10
P128	Zinc	µg/L	830	35	3,500	10	10
	Zirconium	µg/L	27	0.10	100	1	10
Dioxins and Furans							
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/L	690	50	2,400	7	10
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	220	50	1,100	5	10
	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/L	120	50	500	3	10
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/L	97	50	500	1	10
	Octachlorodibenzo-p-dioxin	pg/L	6,100	200	21,000	10	10
	Octachlorodibenzofuran	pg/L	560	99	1,900	2	10
Classical Pollutants							
	Adsorbable Organic Halides (AOX)	µg/L	5,100	1,200	19,000	10	10
	Amenable Cyanide	mg/L	0.0033	5.0×10^{-6}	0.010	1	17
	Ammonia as Nitrogen	mg/L	79	0.29	650	10	10
	BOD 5-day	mg/L	2,300	320	6,000	10	10
	Chemical Oxygen Demand (COD)	mg/L	6,600	830	16,000	10	10
	Chloride	mg/L	900	83	4,800	10	10
	Fluoride	mg/L	21	0.30	180	10	10
	Hexane Extractable Material	mg/L	1,300	6.0	5,300	38	38

Table 6-9 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Nitrate/Nitrite	mg/L	2.6	0.26	9.5	10	10
	SGT-HEM	mg/L	150	5.0	450	29	38
	Surfactants (MBAS)	mg/L	16	0.85	33	10	10
P121	Total Cyanide	mg/L	0.020	0.0050	0.077	13	29
	Total Dissolved Solids	mg/L	5,000	1,700	11,000	10	10
	Total Organic Carbon (TOC)	mg/L	1,500	160	3,200	10	10
	Total Phenols	mg/L	2.6	0.0059	6.8	9	10
	Total Phosphorus	mg/L	22	0.37	53	10	10
	Total Sulfide (Iodometric)	mg/L	0.92	0.83	1.0	1	3
	Total Suspended Solids	mg/L	1,600	38	4,800	10	10
	Volatile Residue	mg/L	2,900	1,900	6,400	4	4

(a) For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration.
(b) Minimum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(c) Maximum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(d) EPA conducted a rigorous analytical data review of all detects in Sampling Episodes 4676 and 4677. Based on this review, EPA determined that the two of the detected dieldrin samples are questionable.

Table 6-10

Summary of Raw Wastewater Characterization Data for Rail/Chemical Facilities

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Volatile Organics							
	Acetone	µg/L	390	50	930	4	5
P004	Benzene	µg/L	27	10	44	1	5
	Carbon Disulfide	µg/L	10	10	11	1	5
P038	Ethylbenzene	µg/L	70	10	180	4	5
	m-Xylene	µg/L	120	10	390	4	5
	Methyl Ethyl Ketone	µg/L	130	50	310	4	5
	Methyl Isobutyl Ketone	µg/L	51	50	58	1	5
	o- + p-Xylene	µg/L	87	10	240	4	5
P086	Toluene	µg/L	97	19	170	5	5
Semivolatile Organics							
P008	1,2,4-Trichlorobenzene	µg/L	80	10	130	1	5
	1-Methylfluorene	µg/L	37	10	230	1	5
	1-Methylphenanthrene	µg/L	61	10	350	2	5
	2,3-Benzofluorene	µg/L	23	10	110	1	5
	2,4-Diaminotoluene	µg/L	1,100	99	6,200	3	5
P031	2,4-Dichlorophenol	µg/L	310	10	590	1	5
P034	2,4-Dimethylphenol	µg/L	25	10	100	3	5
P035	2,4-Dinitrotoluene	µg/L	3,400	10	27,000	1	5
P036	2,6-Dinitrotoluene	µg/L	940	10	7,300	1	5
	2-Isopropylnaphthalene	µg/L	87	10	140	1	5
	2-Methylnaphthalene	µg/L	59	10	400	1	5

Table 6-10 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	5-Nitro-o-toluidine	µg/L	430	10	3,300	1	5
	7,12-Dimethylbenz(a)anthracene	µg/L	24	10	120	1	5
P001	Acenaphthene	µg/L	41	10	260	1	5
P078	Anthracene	µg/L	82	10	500	3	5
P072	Benzo(a)anthracene	µg/L	22	10	100	1	5
	Benzoic Acid	µg/L	1,700	50	6,500	3	5
	Biphenyl	µg/L	51	10	330	1	5
P018	Bis (2-chloroethyl) Ether	µg/L	25	10	100	1	5
P066	Bis (2-ethylhexyl) Phthalate	µg/L	22	10	100	1	5
	Carbazole	µg/L	69	20	370	3	5
P076	Chrysene	µg/L	27	10	150	1	5
	Dimethyl Sulfone	µg/L	50	10	170	2	5
	Diphenyl Ether	µg/L	28	10	100	1	5
P039	Fluoranthene	µg/L	69	10	480	2	5
P080	Fluorene	µg/L	46	10	300	1	5
	Hexanoic Acid	µg/L	2,300	10	9,300	4	5
	n-Decane	µg/L	31	10	100	2	5
	n-Docosane	µg/L	170	10	1,200	3	5
	n-Dodecane	µg/L	260	10	1,400	4	5
	n-Eicosane	µg/L	740	17	4,800	5	5
	n-Hexacosane	µg/L	130	10	420	3	5
	n-Hexadecane	µg/L	1,500	10	8,300	4	5
	n-Octacosane	µg/L	55	10	330	2	5
	n-Octadecane	µg/L	790	15	5,700	5	5
	n-Tetracosane	µg/L	180	10	780	4	5

Table 6-10 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	n-Tetradecane	µg/L	940	10	6,400	4	5
	n-Triacontane	µg/L	75	10	270	2	5
P055	Naphthalene	µg/L	47	10	290	4	5
	p-Cresol	µg/L	35	10	110	2	5
	Perylene	µg/L	35	10	210	1	5
	Phenacetin	µg/L	21	10	100	1	5
P081	Phenanthrene	µg/L	150	10	1,100	3	5
P065	Phenol	µg/L	370	10	1,900	4	5
P084	Pyrene	µg/L	56	10	380	2	5
	Styrene	µg/L	32	10	100	2	5
Phenoxy-Acid Herbicides							
	2,4,5-T	µg/L	13	0.20	20	2	5
	2,4,5-TP	µg/L	13	0.20	20	2	5
	2,4-D	µg/L	73	1.0	180	1	5
	2,4-DB (Butoxon)	µg/L	130	2.2	200	3	5
	Dalapon	µg/L	17	0.20	53	1	5
	Dicamba	µg/L	630	0.54	1,300	4	5
	Dichloroprop	µg/L	70	8.4	100	3	5
	Dinoseb	µg/L	32	0.50	52	3	5
	MCPP	µg/L	42,000	50	82,000	2	5
Organo-Phosphorous Pesticides							
	Chlorpyrifos	µg/L	2.0	2.0	2.0	1	5
	Dioxathion	µg/L	5.8	5.0	8.0	1	4
	Disulfoton	µg/L	2.0	2.0	2.0	1	5
	Tetrachlorvinphos	µg/L	2.1	2.0	3.0	1	5

Table 6-10 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Tokuthion	µg/L	2.5	2.0	4.0	1	4
	Trichlorfon	µg/L	7.2	5.0	18	1	4
	Trichloronate	µg/L	2.1	2.0	2.4	1	5
	Trimethylphosphate	µg/L	2.8	2.0	5.0	2	4
Organo-Halide Pesticides							
P094	4,4'-DDD	µg/L	0.21	0.050	0.44	1	5
P092	4,4'-DDT	µg/L	0.25	0.10	1.3	1	5
	Acephate	µg/L	730	20	5,500	2	5
	Alachlor	µg/L	0.25	0.20	0.60	1	5
P102	alpha-BHC	µg/L	0.19	0.050	0.27	2	5
P091	alpha-Chlordane	µg/L	0.099	0.080	0.11	1	5
	Atrazine	µg/L	84	1.0	630	1	5
	Benefluralin	µg/L	2.2	0.20	12	2	5
P103	beta-BHC	µg/L	26	0.10	200	3	5
	Butachlor	µg/L	0.48	0.30	0.53	1	5
	Captafol	µg/L	1.9	1.2	2.0	1	5
	Carbophenothion	µg/L	1.0	0.50	1.2	1	5
	Chlorobenzilate	µg/L	1.1	0.25	2.7	1	5
	Chloroneb	µg/L	22	0.30	170	1	5
	Dacthal (DCPA)	µg/L	0.40	0.050	1.8	2	5
P105	delta-BHC	µg/L	0.46	0.050	3.0	4	5
	Diallate	µg/L	77	2.2	580	3	5
	Dicofol	µg/L	1.4	1.0	3.4	1	4
P090	Dieldrin	µg/L	1.7	0.040	12	3	5
P095	Endosulfan I	µg/L	0.11	0.10	0.14	1	5

Table 6-10 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P097	Endosulfan Sulfate	µg/L	0.26	0.070	1.3	2	5
P099	Endrin Aldehyde	µg/L	0.28	0.10	1.6	1	5
	Endrin Ketone	µg/L	0.13	0.080	0.33	1	5
	Ethalfluralin	µg/L	4.2	0.050	33	1	5
P104	gamma-BHC	µg/L	0.28	0.050	1.9	1	5
P091	gamma-Chlordane	µg/L	0.085	0.050	0.26	2	5
	Isodrin	µg/L	0.16	0.10	0.52	1	5
	Isopropalin	µg/L	0.56	0.20	3.1	1	5
	Metribuzin	µg/L	0.15	0.050	0.20	1	5
	Mirex	µg/L	0.69	0.20	4.0	1	5
	Nitrofen	µg/L	0.92	0.20	6.0	1	5
	Pendimethalin	µg/L	0.71	0.30	2.4	1	5
	Pentachloronitrobenzene (PCNB)	µg/L	0.10	0.050	0.46	2	5
	Perthane	µg/L	41	10	250	1	5
	Propachlor	µg/L	13	0.10	100	3	5
	Propazine	µg/L	18	1.0	39	3	5
	Simazine	µg/L	24,000	0.80	190,000	1	5
	Strobane	µg/L	46	5.0	170	1	4
	Terbacil	µg/L	19	2.0	140	2	5
	Terbuthylazine	µg/L	2,100	5.0	13,000	3	5
	Triadimefon	µg/L	1.0	0.50	1.6	1	5
	Trifluralin	µg/L	1.6	0.10	12	1	5
Metals							
	Aluminum	µg/L	12,000	2,200	64,000	5	5
P114	Antimony	µg/L	16	4.7	61	3	5

Table 6-10 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P115	Arsenic	µg/L	39	12	120	5	5
	Barium	µg/L	590	100	1,800	5	5
P117	Beryllium	µg/L	0.64	0.20	1.3	1	5
	Bismuth	µg/L	84	67	100	1	5
	Boron	µg/L	2,100	460	5,500	5	5
	Calcium	µg/L	31,000	18,000	56,000	5	5
	Cerium	µg/L	390	280	500	1	5
P119	Chromium	µg/L	50	28	150	5	5
	Cobalt	µg/L	28	18	60	5	5
P120	Copper	µg/L	110	81	180	5	5
	Europium	µg/L	52	3.8	100	1	5
	Gold	µg/L	120	46	200	1	5
	Iron	µg/L	16,000	6,700	26,000	5	5
	Lanthanum	µg/L	98	96	100	1	5
P122	Lead	µg/L	32	12	59	2	5
	Lithium	µg/L	76	39	150	2	5
	Magnesium	µg/L	14,000	6,200	28,000	5	5
	Manganese	µg/L	750	540	1,400	5	5
P123	Mercury	µg/L	0.24	0.20	0.38	2	5
	Molybdenum	µg/L	33	10	72	4	5
P124	Nickel	µg/L	81	36	120	5	5
	Niobium	µg/L	290	71	500	1	5
	Phosphorus	µg/L	8,200	2,100	33,000	5	5
	Platinum	µg/L	300	110	500	1	5
	Potassium	µg/L	970,000	4,500	2,800,000	5	5

Table 6-10 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P125	Selenium	µg/L	11	1.6	20	1	5
	Silicon	µg/L	13,000	5,500	26,000	5	5
	Sodium	µg/L	1,700,000	290,000	6,100,000	5	5
	Strontium	µg/L	340	210	600	5	5
	Sulfur	µg/L	440,000	53,000	1,200,000	5	5
	Tantalum	µg/L	310	110	500	1	5
P127	Thallium	µg/L	7.9	1.3	28	1	5
	Tin	µg/L	28	25	34	1	5
	Titanium	µg/L	67	8.3	400	5	5
	Tungsten	µg/L	310	130	500	1	5
	Uranium	µg/L	880	760	1,000	1	5
	Vanadium	µg/L	48	10	80	3	5
	Ytterbium	µg/L	51	2.7	100	1	5
	Yttrium	µg/L	2.2	0.50	6.4	1	5
P128	Zinc	µg/L	550	77	1,200	5	5
	Zirconium	µg/L	60	19	100	1	5
Dioxins and Furans							
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/L	2,600	50	20,000	1	5
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	330	50	1,800	1	5
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/L	190	50	720	1	5
	2,3,7,8-Tetrachlorodibenzofuran	pg/L	21	10	100	1	5
	Octachlorodibenzo-p-dioxin	pg/L	8,200	100	61,000	3	5
	Octachlorodibenzofuran	pg/L	1,500	100	7,500	3	5
Classical Pollutants							
	Adsorbable Organic Halides (AOX)	µg/L	1,400	150	1,900	5	5

Table 6-10 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Ammonia as Nitrogen	mg/L	25	8.0	48	5	5
	BOD 5-day	mg/L	1,700	260	4,200	5	5
	Chemical Oxygen Demand (COD)	mg/L	4,000	810	20,000	5	5
	Chloride	mg/L	1,200	280	3,900	5	5
	Fluoride	mg/L	1.8	0.90	2.2	5	5
	Hexane Extractable Material	mg/L	810	56	5,200	14	14
	Nitrate/Nitrite	mg/L	5.8	0.050	40	4	5
	SGT-HEM	mg/L	210	18	750	14	14
	Surfactants (MBAS)	mg/L	2.5	1.7	5.0	5	5
P121	Total Cyanide	mg/L	0.019	0.0050	0.10	1	6
	Total Dissolved Solids	mg/L	7,900	980	26,000	5	5
	Total Organic Carbon (TOC)	mg/L	970	150	3,300	5	5
	Total Phenols	mg/L	0.43	0.021	1.5	5	5
	Total Phosphorus	mg/L	9.5	1.4	45	5	5
	Total Suspended Solids	mg/L	530	230	1,400	5	5
	Volatile Residue	mg/L	480	480	480	1	1

(a) For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration.
(b) Minimum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(c) Maximum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.

Table 6-11

Summary of Raw Wastewater Characterization Data for Barge/Chemical & Petroleum Facilities

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Volatile Organics							
P013	1,1-Dichloroethane	µg/L	11	10	20	1	10
P010	1,2-Dichloroethane	µg/L	450	10	11,000	1	10
	Acetone	µg/L	87,000	780	500,000	10	10
P003	Acrylonitrile	µg/L	41,000	50	120,000	3	10
P004	Benzene	µg/L	11,000	45	110,000	10	10
	Carbon Disulfide	µg/L	12	10	31	1	10
P023	Chloroform	µg/L	55	10	1,100	2	10
P038	Ethylbenzene	µg/L	4,500	89	16,000	10	10
	Isobutyl Alcohol	µg/L	180	10	2,100	1	10
	m-Xylene	µg/L	3,200	10	25,000	9	10
	Methyl Ethyl Ketone	µg/L	110,000	50	600,000	8	10
	Methyl Isobutyl Ketone	µg/L	48,000	50	1,100,000	8	10
	Methyl Methacrylate	µg/L	47	10	910	1	10
P044	Methylene Chloride	µg/L	38	10	570	5	10
	o- + p-Xylene	µg/L	2,500	150	21,000	10	10
P085	Tetrachloroethene	µg/L	120	10	1,400	1	10
P086	Toluene	µg/L	13,000	410	51,000	10	10
P087	Trichloroethene	µg/L	13	10	55	4	10
P088	Vinyl Chloride	µg/L	13	10	77	1	10
Semivolatile Organics							
P025	1,2-Dichlorobenzene	µg/L	9,400	10	56,000	1	10

Table 6-11 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	1-Methylfluorene	µg/L	360	10	1,300	4	10
	1-Methylphenanthrene	µg/L	1,400	17	13,000	9	10
	1-Phenylnaphthalene	µg/L	63	10	200	1	10
	2,3-Benzofluorene	µg/L	100	10	580	3	10
P034	2,4-Dimethylphenol	µg/L	98	10	470	1	10
	2-Methylnaphthalene	µg/L	7,800	130	81,000	10	10
	2-Phenylnaphthalene	µg/L	80	10	590	1	10
	3,6-Dimethylphenanthrene	µg/L	200	10	870	5	10
P001	Acenaphthene	µg/L	660	10	9,500	6	10
P077	Acenaphthylene	µg/L	610	10	13,000	3	10
	Aniline	µg/L	59	10	200	1	10
P078	Anthracene	µg/L	390	10	7,400	2	10
	Benzoic Acid	µg/L	800	50	1,900	4	10
	Benzyl Alcohol	µg/L	66	10	200	1	10
	Biphenyl	µg/L	2,500	29	26,000	9	10
P066	Bis (2-ethylhexyl) Phthalate	µg/L	700	12	7,500	8	10
P069	Di-n-Octyl Phthalate	µg/L	790	10	12,000	4	10
P039	Fluoranthene	µg/L	62	10	200	1	10
P080	Fluorene	µg/L	970	10	13,000	6	10
P009	Hexachlorobenzene	µg/L	67	10	390	1	10
P012	Hexachloroethane	µg/L	65	10	200	1	10
	Hexanoic Acid	µg/L	130	10	570	1	10
	n-Decane	µg/L	75,000	10	1,200,000	9	10
	n-Docosane	µg/L	2,600	34	49,000	10	10
	n-Dodecane	µg/L	34,000	450	360,000	10	10

Table 6-11 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	n-Eicosane	µg/L	7,700	93	110,000	10	10
	n-Hexacosane	µg/L	140	10	550	7	10
	n-Hexadecane	µg/L	34,000	110	370,000	10	10
	n-Octacosane	µg/L	82	10	290	5	10
	n-Octadecane	µg/L	14,000	95	170,000	10	10
	n-Tetracosane	µg/L	1,400	33	15,000	9	10
	n-Tetradecane	µg/L	84,000	630	1,100,000	10	10
	n-Triacontane	µg/L	340	10	1,500	2	10
P055	Naphthalene	µg/L	74,000	530	1,100,000	10	10
	o-Cresol	µg/L	110	10	620	1	10
	p-Cresol	µg/L	120	10	740	1	10
	p-Cymene	µg/L	6,400	11	150,000	5	10
	Pentachloroethane	µg/L	120	20	400	1	10
	Pentamethylbenzene	µg/L	1,600	10	6,700	4	10
P081	Phenanthrene	µg/L	1,500	10	16,000	7	10
P065	Phenol	µg/L	170	10	990	3	10
P084	Pyrene	µg/L	520	10	4,200	7	10
	Styrene	µg/L	96,000	570	630,000	10	10
	Thianaphthene	µg/L	60	10	200	1	10
Phenoxy-Acid Herbicides							
	2,4-D	µg/L	150	1.9	1,000	1	6
	Dalapon	µg/L	33	0.20	200	2	6
	MCPA	µg/L	9,700	1,200	50,000	2	6
Organo-Phosphorous Pesticides							
	Malathion	µg/L	3.6	2.2	5.1	2	2

Table 6-11 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Parathion (Ethyl)	µg/L	6.6	2.2	11	2	2
	Sulfotep	µg/L	2.2	2.0	2.3	1	2
	Trichlorfon	µg/L	7.1	5.0	9.2	1	2
Organo-Halide Pesticides							
P094	4,4'-DDD	µg/L	1.2	0.45	2.0	1	2
P089	Aldrin	µg/L	1.4	0.20	2.6	1	2
P102	alpha-BHC	µg/L	0.30	0.10	0.50	1	2
	Chlorobenzilate	µg/L	7.8	5.6	10	1	2
P090	Dieldrin	µg/L	0.37	0.040	0.70	1	2
	Ethalfluralin	µg/L	2.7	0.10	5.3	1	2
P091	gamma-Chlordane	µg/L	0.28	0.050	0.50	1	2
	Metribuzin	µg/L	1.6	1.1	2.0	1	2
	Propachlor	µg/L	2.1	1.0	3.3	1	2
Metals							
	Aluminum	µg/L	25,000	100	360,000	6	6
P114	Antimony	µg/L	9.8	1.6	30	4	6
P115	Arsenic	µg/L	11	1.1	94	3	6
	Barium	µg/L	260	66	1,400	6	6
P117	Beryllium	µg/L	1.4	0.20	15	2	6
	Bismuth	µg/L	120	46	900	1	6
	Boron	µg/L	910	550	1,500	6	6
P118	Cadmium	µg/L	43	1.0	390	5	6
	Calcium	µg/L	140,000	60,000	320,000	6	6
	Cerium	µg/L	400	170	1,700	2	6
P119	Chromium	µg/L	330	2.6	2,600	4	6

Table 6-11 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Cobalt	µg/L	37	2.1	280	2	6
P120	Copper	µg/L	880	76	6,000	6	6
	Europium	µg/L	18	2.9	200	1	6
	Germanium	µg/L	280	78	1,000	2	6
	Gold	µg/L	100	34	400	2	6
	Hafnium	µg/L	240	100	1,000	1	6
	Hexavalent Chromium	mg/L	0.19	0.070	0.27	3	3
	Iodine	µg/L	39,000	2,000	210,000	1	6
	Iridium	µg/L	390	42	2,400	4	6
	Iron	µg/L	610,000	3,000	6,600,000	6	6
	Lanthanum	µg/L	170	24	2,000	1	6
P122	Lead	µg/L	370	12	1,800	4	6
	Lithium	µg/L	170	31	390	4	6
	Lutetium	µg/L	23	3.2	200	2	6
	Magnesium	µg/L	70,000	19,000	240,000	6	6
	Manganese	µg/L	4,100	140	38,000	6	6
P123	Mercury	µg/L	5.4	0.10	81	3	6
	Molybdenum	µg/L	330	20	860	5	6
	Neodymium	µg/L	59	19	400	1	6
P124	Nickel	µg/L	1,900	58	14,000	6	6
	Niobium	µg/L	210	32	1,600	3	6
	Osmium	µg/L	800	36	12,000	2	6
	Phosphorus	µg/L	15,000	690	56,000	5	6
	Platinum	µg/L	380	66	1,000	3	6
	Potassium	µg/L	31,000	22,000	65,000	6	6

Table 6-11 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Praseodymium	µg/L	160	38	1,000	3	6
	Rhenium	µg/L	97	19	1,000	1	6
	Ruthenium	µg/L	3,400	110	40,000	4	6
	Scandium	µg/L	14	0.80	200	1	6
P125	Selenium	µg/L	4.0	1.0	20	1	6
	Silicon	µg/L	21,000	28	130,000	4	6
P126	Silver	µg/L	5.7	1.8	34	3	6
	Sodium	µg/L	1,700,000	990,000	5,800,000	6	6
	Strontium	µg/L	4,700	980	12,000	6	6
	Sulfur	µg/L	460,000	96,000	2,100,000	6	6
	Tantalum	µg/L	300	50	1,700	4	6
	Thorium	µg/L	440	120	3,400	2	6
	Tin	µg/L	56	22	220	1	6
	Titanium	µg/L	38	1.6	300	5	6
	Tungsten	µg/L	300	120	1,200	2	6
	Uranium	µg/L	1,200	610	6,100	1	6
	Vanadium	µg/L	43	1.7	410	3	6
	Ytterbium	µg/L	22	1.1	200	5	6
	Yttrium	µg/L	5.5	0.40	56	2	6
P128	Zinc	µg/L	19,000	630	79,000	6	6
	Zirconium	µg/L	35	11	260	2	6
Dioxins and Furans							
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	320	50	4,100	1	10
	Octachlorodibenzo-p-dioxin	pg/L	9,400	100	100,000	4	10
	Octachlorodibenzofuran	pg/L	960	100	8,200	3	10

Table 6-11 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Classical Pollutants							
	Adsorbable Organic Halides (AOX)	µg/L	940	82	3,500	10	10
	Amenable Cyanide	mg/L	0.092	0.0020	0.18	1	8
	Ammonia as Nitrogen	mg/L	54	0.60	150	10	10
	BOD 5-day	mg/L	5,700	120	26,000	10	10
	Chemical Oxygen Demand (COD)	mg/L	44,000	130	200,000	10	10
	Chloride	mg/L	1,100	40	2,800	10	10
	Fluoride	mg/L	1.4	0.74	3.9	9	9
	Hexane Extractable Material	mg/L	14,000	37	220,000	27	27
	Nitrate/nitrite	mg/L	22	0.16	55	10	10
	SGT-HEM	mg/L	6,300	21	98,000	25	25
	Surfactants (MBAS)	mg/L	9.0	0.12	13	6	6
P121	Total Cyanide	mg/L	0.11	0.0040	0.21	5	8
	Total Dissolved Solids	mg/L	3,100	1.0	17,000	9	10
	Total Organic Carbon (TOC)	mg/L	10,000	30	53,000	10	10
	Total Phenols	mg/L	0.48	0.018	2.5	10	10
	Total Phosphorus	mg/L	6.4	0.080	31	10	10
	Total Sulfide (Iodometric)	mg/L	4.6	4.6	4.6	1	1
	Total Suspended Solids	mg/L	2,200	55	15,000	10	10
	Volatile Residue	mg/L	350	1.0	710	1	2

(a) For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration.
(b) Minimum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(c) Maximum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.

Table 6-12

Summary of Raw Wastewater Characterization Data for Truck/Food Facilities

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Volatile Organics							
	Acetone	µg/L	97	50	140	1	2
P023	Chloroform	µg/L	93	10	180	1	2
	Methyl Ethyl Ketone	µg/L	55	50	60	1	2
	Trichlorofluoromethane	µg/L	1,500	10	2,900	1	2
Semivolatile Organics							
	Benzoic Acid	µg/L	210	180	230	2	2
	Dimethyl Sulfone	µg/L	21	10	33	1	2
	Hexanoic Acid	µg/L	380	110	660	2	2
	n-Hexacosane	µg/L	85	10	160	1	2
	n-Octacosane	µg/L	74	10	140	1	2
	n-Tetracosane	µg/L	53	10	96	1	2
	n-Triacontane	µg/L	88	10	170	1	2
Phenoxy-Acid Herbicides							
	MCPA	µg/L	170	50	300	1	2
Organo-Halide Pesticides							
	Diallate A	µg/L	2.9	2.4	3.5	1	2
Metals							
	Aluminum	µg/L	190	28	360	1	2
P114	Antimony	µg/L	21	18	25	1	2
	Barium	µg/L	12	6.3	18	2	2
	Bismuth	µg/L	1.5	0.10	2.8	1	2
	Boron	µg/L	300	170	420	2	2

Table 6-12 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Calcium	µg/L	2,900	1,300	4,400	2	2
P120	Copper	µg/L	170	34	300	2	2
	Erbium	µg/L	4.5	0.10	8.9	1	2
	Europium	µg/L	4.8	0.10	9.5	1	2
	Gadolinium	µg/L	1.9	0.50	3.2	1	2
	Gallium	µg/L	2.0	0.50	3.5	1	2
	Germanium	µg/L	46	0.50	91	1	2
	Hafnium	µg/L	7.6	1.0	14	1	2
	Hexavalent Chromium	mg/L	0.020	0.010	0.030	1	2
	Indium	µg/L	20	1.0	38	1	2
	Iridium	µg/L	24	1.0	46	1	2
	Iron	µg/L	670	7.0	1,300	2	2
	Lanthanum	µg/L	1.4	0.10	2.7	1	2
	Lithium	µg/L	4.7	0.10	9.2	1	2
	Magnesium	µg/L	2,900	370	5,400	2	2
	Manganese	µg/L	26	2.0	50	2	2
P123	Mercury	µg/L	1.8	0.71	2.8	2	2
	Neodymium	µg/L	6.7	0.50	13	1	2
	Niobium	µg/L	150	150	150	2	2
	Palladium	µg/L	1.3	0.50	2.0	1	2
	Platinum	µg/L	67	35	98	2	2
	Praseodymium	µg/L	10	1.0	20	1	2
	Rhenium	µg/L	1.1	1.0	1.2	1	2
	Ruthenium	µg/L	6.6	1.0	12	1	2
	Samarium	µg/L	16	7.2	25	2	2
P125	Selenium	µg/L	18	4.6	31	1	2

Table 6-12 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Silicon	µg/L	9,500	2,900	16,000	2	2
	Sodium	µg/L	280,000	220,000	340,000	2	2
	Strontium	µg/L	19	4.5	33	2	2
	Tantalum	µg/L	17	10	25	2	2
	Tellurium	µg/L	6.3	1.0	12	1	2
	Terbium	µg/L	18	16	21	2	2
	Thorium	µg/L	3.4	1.0	5.8	1	2
	Titanium	µg/L	11	10	12	2	2
	Tungsten	µg/L	7.9	1.0	15	1	2
	Uranium	µg/L	270	1.0	540	1	2
P128	Zinc	µg/L	66	18	120	2	2
	Zirconium	µg/L	3.8	0.10	7.4	1	2
Dioxins and Furans							
	Octachlorodibenzo-p-dioxin	pg/L	380	100	650	1	2
Classical Pollutants							
	Adsorbable Organic Halides (AOX)	µg/L	2,000	190	3,900	2	2
	Amenable Cyanide	mg/L	0.0068	0.0050	0.016	1	7
	Ammonia as Nitrogen	mg/L	0.035	0.010	0.060	1	2
	BOD 5-day	mg/L	2,700	160	5,200	2	2
	Chemical Oxygen Demand (COD)	mg/L	3,000	380	5,600	2	2
	Chloride	mg/L	76	68	83	2	2
	Fluoride	mg/L	0.57	0.28	0.85	2	2
	SGT-HEM	mg/L	9.0	5.0	26	2	7
	Nitrate/Nitrite	mg/L	1.9	0.050	3.7	1	2
	Hexane Extractable Material	mg/L	130	5.2	270	7	7
	Surfactants (MBAS)	mg/L	10	0.49	20	2	2

Table 6-12 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P121	Total Cyanide	mg/L	0.0068	0.0050	0.016	1	7
	Total Dissolved Solids	mg/L	3,400	810	6,000	2	2
	Total Organic Carbon (TOC)	mg/L	1,300	86	2,500	2	2
	Total Phenols	mg/L	0.038	0.0050	0.070	1	2
	Total Phosphorus	mg/L	67	11	120	2	2
	Total Sulfide (Iodometric)	mg/L	3.5	1.0	6.0	1	2
	Total Suspended Solids	mg/L	420	28	800	2	2
	Volatile Residue	mg/L	4,300	310	8,300	2	2

(a) For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration.
(b) Minimum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(c) Maximum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.

Table 6-13

Summary of Raw Wastewater Characterization Data for Rail/Food Facilities

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Semivolatile Organics							
	Benzoic Acid	µg/L	78	78	78	1	1
P065	Phenol	µg/L	58	58	58	1	1
Organo-Phosphorous Pesticides							
	Diazinon	µg/L	31	31	31	1	1
Metals							
	Aluminum	µg/L	150	150	150	1	1
	Barium	µg/L	18	18	18	1	1
	Boron	µg/L	39	39	39	1	1
P118	Cadmium	µg/L	2.4	2.4	2.4	1	1
	Calcium	µg/L	31,000	31,000	31,000	1	1
	Europium	µg/L	10	10	10	1	1
	Gadolinium	µg/L	54	54	54	1	1
	Holmium	µg/L	140	140	140	1	1
	Iridium	µg/L	81	81	81	1	1
	Iron	µg/L	270	270	270	1	1
	Lutetium	µg/L	4.5	4.5	4.5	1	1
	Magnesium	µg/L	10,000	10,000	10,000	1	1
	Manganese	µg/L	4.8	4.8	4.8	1	1
	Molybdenum	µg/L	34	34	34	1	1
	Neodymium	µg/L	61	61	61	1	1
P124	Nickel	µg/L	9.8	9.8	9.8	1	1

Table 6-13 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Niobium	µg/L	81	81	81	1	1
	Phosphorus	µg/L	1,800	1,800	1,800	1	1
	Rhenium	µg/L	26	26	26	1	1
	Silicon	µg/L	680	680	680	1	1
	Sodium	µg/L	6,400	6,400	6,400	1	1
	Strontium	µg/L	110	110	110	1	1
	Sulfur	µg/L	6,700	6,700	6,700	1	1
	Tantalum	µg/L	50	50	50	1	1
	Thulium	µg/L	23	23	23	1	1
	Tungsten	µg/L	320	320	320	1	1
Dioxins and Furans							
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	300	300	300	1	1
	Octachlorodibenzofuran	pg/L	490	490	490	1	1
Classical Pollutants							
	Adsorbable Organic Halides (AOX)	µg/L	15	15	15	1	1
	Ammonia as Nitrogen	mg/L	0.040	0.040	0.040	1	1
	Chemical Oxygen Demand (COD)	mg/L	34,000	34,000	34,000	1	1
	Chloride	mg/L	10	10	10	1	1
	Fluoride	mg/L	0.39	0.39	0.39	1	1
	Nitrate/nitrite	mg/L	0.16	0.16	0.16	1	1
	Surfactants (MBAS)	mg/L	0.011	0.011	0.011	1	1
P121	Total Cyanide	mg/L	0.0043	0.0026	0.0061	2	4
	Total Dissolved Solids	mg/L	25,000	25,000	25,000	1	1
	Total Organic Carbon (TOC)	mg/L	13,000	13,000	13,000	1	1
	Total Phenols	mg/L	0.018	0.018	0.018	1	1

Table 6-13 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Total Phosphorus	mg/L	1.8	1.8	1.8	1	1
	Total Sulfide (Iodometric)	mg/L	11	11	11	1	1
	Total Suspended Solids	mg/L	27	27	27	1	1

(a) For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration.
(b) Minimum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(c) Maximum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.

Table 6-14

Summary of Raw Wastewater Characterization Data for Barge/Food Facilities

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Volatile Organics							
	Acetone	µg/L	180	180	180	1	1
	Methyl Ethyl Ketone	µg/L	130	130	130	1	1
Semivolatile Organics							
	1,3,5-Trithiane	µg/L	280	50	500	1	5
	Benzoic Acid	µg/L	2,200	50	4,100	3	5
	Hexanoic Acid	µg/L	64,000	2,000	150,000	5	5
	n-Tetradecane	µg/L	55	10	100	1	5
	o-Cresol	µg/L	79	10	200	1	5
P065	Phenol	µg/L	200	10	540	3	5
Phenoxy-Acid Herbicides							
	2,4-D	µg/L	7.5	7.5	7.5	1	1
Organo-Halide Pesticides							
	Diallate A	µg/L	21	21	21	1	1
Metals							
	Aluminum	µg/L	1,700	1,700	1,700	1	1
	Barium	µg/L	88	88	88	1	1
P118	Cadmium	µg/L	4.6	4.6	4.6	1	1
	Calcium	µg/L	21,000	21,000	21,000	1	1
P119	Chromium	µg/L	47	47	47	1	1
	Cobalt	µg/L	19	19	19	1	1
P120	Copper	µg/L	100	100	100	1	1

Table 6-14 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Europium	µg/L	12	12	12	1	1
	Gadolinium	µg/L	36	36	36	1	1
	Gallium	µg/L	170	170	170	1	1
	Germanium	µg/L	290	290	290	1	1
	Hafnium	µg/L	29	29	29	1	1
	Hexavalent Chromium	mg/L	0.31	0.31	0.31	1	1
	Iron	µg/L	42,000	42,000	42,000	1	1
P122	Lead	µg/L	150	150	150	1	1
	Lithium	µg/L	8.5	8.5	8.5	1	1
	Lutetium	µg/L	1.8	1.8	1.8	1	1
	Magnesium	µg/L	17,000	17,000	17,000	1	1
	Manganese	µg/L	410	410	410	1	1
P123	Mercury	µg/L	0.41	0.41	0.41	1	1
	Molybdenum	µg/L	18	18	18	1	1
	Neodymium	µg/L	5.4	5.4	5.4	1	1
P124	Nickel	µg/L	210	210	210	1	1
	Niobium	µg/L	150	150	150	1	1
	Osmium	µg/L	12	12	12	1	1
	Palladium	µg/L	9.4	9.4	9.4	1	1
	Platinum	µg/L	520	520	520	1	1
	Rhenium	µg/L	18	18	18	1	1
	Ruthenium	µg/L	120	120	120	1	1
	Samarium	µg/L	29	29	29	1	1
	Scandium	µg/L	0.26	0.26	0.26	1	1
	Silicon	µg/L	7,400	7,400	7,400	1	1

Table 6-14 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P126	Silver	µg/L	20	20	20	1	1
	Sodium	µg/L	550,000	550,000	550,000	1	1
	Strontium	µg/L	110	110	110	1	1
	Terbium	µg/L	5.6	5.6	5.6	1	1
	Thulium	µg/L	17	17	17	1	1
	Uranium	µg/L	940	940	940	1	1
	Vanadium	µg/L	12	12	12	1	1
P128	Zinc	µg/L	330	330	330	1	1
Dioxins and Furans							
	2,3,7,8-Tetrachlorodibenzofuran	pg/L	11	11	11	1	1
	Octachlorodibenzo-p-dioxin	pg/L	110	110	110	1	1
Classical Pollutants							
	Ammonia as Nitrogen	mg/L	3.0	0.77	9.3	5	5
	BOD 5-day	mg/L	4,600	890	6,800	5	5
	Chemical Oxygen Demand (COD)	mg/L	7,300	540	12,000	5	5
	Chloride	mg/L	150	88	180	5	5
	Fluoride	mg/L	0.34	0.28	0.46	5	5
	Hexane Extractable Material	mg/L	720	75	1,100	5	5
	Nitrate/Nitrite	mg/L	0.093	0.050	0.30	3	5
	SGT-HEM	mg/L	52	5.0	140	3	5
	Surfactants (MBAS)	mg/L	2.8	2.8	2.8	1	1
	Total Dissolved Solids	mg/L	3,000	1,800	3,700	5	5
	Total Organic Carbon (TOC)	mg/L	2,500	1,600	3,300	5	5
	Total Phenols	mg/L	0.50	0.26	1.2	5	5
	Total Phosphorus	mg/L	92	51	180	5	5

Table 6-14 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Total Sulfide (Iodometric)	mg/L	16	16	16	1	1
	Total Suspended Solids	mg/L	1,300	260	2,000	5	5
	Volatile Residue	mg/L	2,500	2,500	2,500	1	1

(a) For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration.
(b) Minimum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(c) Maximum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.

Table 6-15

Summary of Raw Wastewater Characterization Data for Truck/Petroleum Facilities

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Volatile Organics							
	Acetone	µg/L	180	99	310	5	5
	m-Xylene	µg/L	10	10	12	1	5
P086	Toluene	µg/L	20	10	43	2	5
Semivolatile Organics							
	Biphenyl	µg/L	410	10	2,000	1	5
P066	Bis (2-ethylhexyl) Phthalate	µg/L	110	68	150	5	5
	Diphenyl Ether	µg/L	11	10	16	1	5
	n-Decane	µg/L	10	10	11	1	5
	n-Docosane	µg/L	26	10	47	4	5
	n-Dodecane	µg/L	20	10	34	3	5
	n-Eicosane	µg/L	53	22	87	5	5
	n-Hexacosane	µg/L	26	10	37	3	5
	n-Hexadecane	µg/L	36	10	79	4	5
	n-Octacosane	µg/L	64	43	110	5	5
	n-Octadecane	µg/L	45	21	94	5	5
	n-Tetracosane	µg/L	40	10	100	3	5
	n-Tetradecane	µg/L	40	12	69	5	5
	n-Triacontane	µg/L	93	10	140	4	5
P065	Phenol	µg/L	18	10	35	2	5
Metals							
	Aluminum	µg/L	500	180	850	5	5

Table 6-15 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P114	Antimony	µg/L	4.2	3.8	5.9	1	5
P115	Arsenic	µg/L	4.9	3.3	11	1	5
	Barium	µg/L	73	42	96	5	5
	Bismuth	µg/L	81	46	120	4	5
	Boron	µg/L	430	320	540	5	5
P118	Cadmium	µg/L	2.0	1.6	3.0	2	5
	Calcium	µg/L	30,000	12,000	58,000	5	5
	Cerium	µg/L	210	170	320	2	5
P119	Chromium	µg/L	9.1	4.4	28	2	5
P120	Copper	µg/L	5.8	2.8	18	1	5
	Erbium	µg/L	25	24	28	1	5
	Europium	µg/L	6.3	2.9	16	4	5
	Holmium	µg/L	60	39	78	5	5
	Iron	µg/L	1,400	860	2,200	5	5
	Lanthanum	µg/L	27	24	38	1	5
	Lutetium	µg/L	3.3	3.2	3.8	1	5
	Magnesium	µg/L	2,900	1,300	4,900	5	5
	Manganese	µg/L	150	65	280	5	5
P123	Mercury	µg/L	0.29	0.20	0.63	1	5
	Molybdenum	µg/L	110	68	200	5	5
	Neodymium	µg/L	21	19	26	2	5
	Phosphorus	µg/L	2,500	1,500	5,900	5	5
	Potassium	µg/L	5,200	4,100	7,200	5	5
	Praseodymium	µg/L	44	38	52	3	5
	Samarium	µg/L	96	87	130	1	5

Table 6-15 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Silicon	µg/L	8,800	4,100	13,000	5	5
	Sodium	µg/L	500,000	380,000	730,000	5	5
	Strontium	µg/L	100	59	140	5	5
	Sulfur	µg/L	6,700	3,300	17,000	5	5
	Tantalum	µg/L	72	57	98	5	5
	Titanium	µg/L	6.4	1.2	18	3	5
	Tungsten	µg/L	190	130	440	2	5
	Uranium	µg/L	640	610	750	1	5
	Vanadium	µg/L	3.8	3.3	6.0	1	5
	Ytterbium	µg/L	1.1	0.90	1.8	1	5
P128	Zinc	µg/L	350	190	490	5	5
	Zirconium	µg/L	11	11	14	1	5
Classical Pollutants							
	Ammonia as Nitrogen	mg/L	0.30	0.16	0.48	5	5
	BOD 5-day	mg/L	67	48	110	5	5
	Chemical Oxygen Demand (COD)	mg/L	660	580	740	5	5
	Chloride	mg/L	530	400	800	5	5
	Fluoride	mg/L	1.5	1.1	2.0	5	5
	Hexane Extractable Material	mg/L	260	22	1,200	60	60
	SGT-HEM	mg/L	130	5.0	410	59	60
	Total Dissolved Solids	mg/L	1,300	950	1,900	5	5
	Total Organic Carbon (TOC)	mg/L	110	28	210	5	5

Table 6-15 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Total Phosphorus	mg/L	2.9	2.0	6.5	5	5
	Total Suspended Solids	mg/L	230	130	360	5	5

(a) For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration.
(b) Minimum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(c) Maximum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.

Table 6-16

Summary of Raw Wastewater Characterization Data for Barge/Hopper Facilities

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
Semivolatile Organics							
P066	Bis (2-ethylhexyl) Phthalate	µg/L	43	43	43	1	1
Metals							
	Aluminum	µg/L	15,000	15,000	15,000	1	1
P115	Arsenic	µg/L	51	51	51	1	1
	Barium	µg/L	150	150	150	1	1
P117	Beryllium	µg/L	4.9	4.9	4.9	1	1
	Bismuth	µg/L	46	46	46	1	1
	Boron	µg/L	160	160	160	1	1
P118	Cadmium	µg/L	11	11	11	1	1
	Calcium	µg/L	280,000	280,000	280,000	1	1
	Cerium	µg/L	380	380	380	1	1
P119	Chromium	µg/L	130	130	130	1	1
P120	Copper	µg/L	62	62	62	1	1
	Erbium	µg/L	27	27	27	1	1
	Europium	µg/L	2.9	2.9	2.9	1	1
	Gadolinium	µg/L	67	67	67	1	1
	Gold	µg/L	54	54	54	1	1
	Hexavalent Chromium	mg/L	0.046	0.046	0.046	1	1
	Holmium	µg/L	45	45	45	1	1
	Iridium	µg/L	240	240	240	1	1
	Iron	µg/L	87,000	87,000	87,000	1	1

Table 6-16 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
	Lanthanum	µg/L	50	50	50	1	1
	Lithium	µg/L	50	50	50	1	1
	Lutetium	µg/L	3.6	3.6	3.6	1	1
	Magnesium	µg/L	31,000	31,000	31,000	1	1
	Manganese	µg/L	2,900	2,900	2,900	1	1
	Molybdenum	µg/L	54	54	54	1	1
P124	Nickel	µg/L	110	110	110	1	1
	Osmium	µg/L	440	440	440	1	1
	Phosphorus	µg/L	610,000	610,000	610,000	1	1
	Platinum	µg/L	66	66	66	1	1
	Potassium	µg/L	31,000	31,000	31,000	1	1
	Praseodymium	µg/L	79	79	79	1	1
	Ruthenium	µg/L	1,300	1,300	1,300	1	1
	Samarium	µg/L	87	87	87	1	1
	Silicon	µg/L	2,800	2,800	2,800	1	1
P126	Silver	µg/L	6.9	6.9	6.9	1	1
	Sodium	µg/L	150,000	150,000	150,000	1	1
	Strontium	µg/L	380	380	380	1	1
	Sulfur	µg/L	150,000	150,000	150,000	1	1
	Tantalum	µg/L	65	65	65	1	1
	Titanium	µg/L	450	450	450	1	1
	Tungsten	µg/L	130	130	130	1	1
	Vanadium	µg/L	180	180	180	1	1
	Ytterbium	µg/L	7.2	7.2	7.2	1	1
	Yttrium	µg/L	72	72	72	1	1

Table 6-16 (Continued)

Priority Pollutant Code	Analyte	Units	Mean Concentration (a)	Minimum Concentration (b)	Maximum Concentration (c)	Number of Times Detected	Number of Times Analyzed
P128	Zinc	µg/L	250	250	250	1	1
	Zirconium	µg/L	33	33	33	1	1
Classical Pollutants							
	Ammonia as Nitrogen	mg/L	520	520	520	1	1
	BOD 5-day	mg/L	17	17	17	1	1
	Chemical Oxygen Demand (COD)	mg/L	640	640	640	1	1
	Chloride	mg/L	190	190	190	1	1
	Fluoride	mg/L	20	20	20	1	1
	Nitrate/Nitrite	mg/L	3.0	3.0	3.0	1	1
	Total Dissolved Solids	mg/L	2,900	2,900	2,900	1	1
	Total Organic Carbon (TOC)	mg/L	61	61	61	1	1
	Total Phosphorus	mg/L	540	540	540	1	1
	Total Suspended Solids	mg/L	1,400	1,400	1,400	1	1

(a) For samples in which individual pollutants were not detected, the sample detection limit was used in calculating the mean concentration.
(b) Minimum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.
(c) Maximum value of detected amounts or detection limits (for samples in which individual pollutants were not detected) from all analyses.

Table 6-17

Summaries of the Raw Wastewater Characterization Data for Each Facility Type

Facility Type	Number of Priority Pollutants Detected	Number of Pollutants Detected
Truck/Chemical	55	202
Rail/Chemical	43	180
Barge/Chemical & Petroleum	45	159
Truck/Petroleum	10	67
Truck/Food	7	76
Rail/Food	4	45
Barge/Food	9	68
Barge/Hopper	9	57

Facility Type	Range of Pollutant Concentrations (mg/L)					
	BOD_5	COD	TOC	TSS	HEM	SGT-HEM
Truck/Chemical	320 to 6,000	830 to 16,000	160 to 3,200	38 to 4,800	6.0 to 5,300	5.0 to 450
Rail/Chemical	260 to 4,200	810 to 20,000	150 to 3,300	230 to 1,400	56 to 5,200	18 to 750
Barge/Chemical & Petroleum	120 to 26,000	130 to 200,000	30 to 53,000	55 to 15,000	37 to 220,000	21 to 98,000
Truck/Petroleum	48 to 110	580 to 740	28 to 210	130 to 360	22 to 1,200	5.0 to 410
Truck/Food	160 to 5,200	380 to 5,600	86 to 2,500	28 to 800	5.2 to 270	5.0 to 26
Rail/Food	NQ	34,000	13,000	27	ND	ND
Barge/Food	890 to 6,800	540 to 12,000	1,600 to 3,300	260 to 2,000	75 to 1,100	5.0 to 140
Barge/Hopper	17	640	61	1,400	ND	ND

ND - Not detected.
NQ - Not quantitated due to matrix interference.
BOD_5 - Biochemical oxygen demand (5-day).
COD - Chemical oxygen demand.
TOC - Total organic carbon.
TSS - Total suspended solids.
HEM - Hexane extractable material.
SGT-HEM - Silica-gel treated hexane extractable material.

Table 6-18

Pollutants Of Interest By Subcategory

Analyte	Subcategory				
	Truck/Chemical & Petroleum	Rail/Chemical & Petroleum	Barge/Chemical & Petroleum	Food	Truck/Hopper, Rail/Hopper, and Barge/Hopper
Volatile Organics					
1,1,1-Trichloroethane	✓				
1,2-Dichloroethane	✓				
Acetone	✓	✓	✓		
Acrylonitrile			✓		
Benzene	✓		✓		
Chloroform	✓		✓		
Ethylbenzene	✓	✓	✓		
M-Xylene	✓	✓	✓		
Methyl Ethyl Ketone	✓		✓		
Methyl Isobutyl Ketone	✓		✓		
Methylene Chloride	✓		✓		
O- + P-Xylene	✓	✓	✓		
Tetrachloroethene	✓				
Toluene	✓		✓		
Tricloroethene	✓				
Semivolatile Organics					
1-Methylfluorene			✓		
1-Methylphenanthrene		✓	✓		
1,2-Dichlorobenzene	✓				

Table 6-18 (Continued)

Analyte	Subcategory				
	Truck/Chemical & Petroleum	Rail/Chemical & Petroleum	Barge/Chemical & Petroleum	Food	Truck/Hopper, Rail/Hopper, and Barge/Hopper
2-Chlorophenol	✓				
2-Isopropylnaphthalene	✓				
2-Methylnaphthalene	✓		✓		
2,3-Benzofluorene			✓		
2,4-Diaminotoluene		✓			
2,4,6-Trichlorophenol	✓				
3,6-Dimethylphenanthrene			✓		
Acenaphthene			✓		
Acenaphthylene			✓		
Alpha-terpineol	✓				
Anthracene		✓	✓		
Benzoic Acid	✓	✓	✓		
Benzyl Alcohol	✓				
Biphenyl			✓		
Bis(2-ethylhexyl) Phthalate	✓		✓		
Carbazole		✓			
Di-n-octyl Phthalate	✓		✓		
Dimethyl Sulfone	✓	✓			
Fluoranthene		✓			
Fluorene			✓		
Hexanoic Acid		✓		✓	
N-Decane	✓		✓		
N-Docosane	✓	✓	✓		

Table 6-18 (Continued)

Analyte	Subcategory				
	Truck/Chemical & Petroleum	Rail/Chemical & Petroleum	Barge/Chemical & Petroleum	Food	Truck/Hopper, Rail/Hopper, and Barge/Hopper
N-Dodecane	✓	✓	✓		
N-Eicosane	✓	✓	✓		
N-Hexacosane	✓	✓	✓		
N-Hexadecane	✓	✓	✓		
N-Octacosane		✓	✓		
N-Octadecane	✓	✓	✓		
N-Tetracosane	✓	✓	✓		
N-Tetradecane	✓	✓	✓		
N-Triacontane	✓	✓			
Napthalene	✓	✓	✓		
O-Cresol	✓			✓	
P-Cresol	✓	✓			
P-Cymene	✓		✓		
Pentamethylbenzene			✓		
Phenanthrene		✓	✓		
Phenol	✓	✓	✓	✓	
Pyrene		✓	✓		
Styrene	✓	✓	✓		
Phenoxy-Acid Herbicides					
2,4,5-T	✓	✓			
2,4,5-TP	✓	✓			
2,4-D	✓			✓	
2,4-DB (Butoxon)	✓	✓			

Table 6-18 (Continued)

Analyte	Subcategory				
	Truck/Chemical & Petroleum	Rail/Chemical & Petroleum	Barge/Chemical & Petroleum	Food	Truck/Hopper, Rail/Hopper, and Barge/Hopper
Dalapon	✓		✓		
Dicamba		✓			
Dichlorprop		✓			
Dinoseb	✓	✓			
MCPA	✓				
MCPP		✓			
Organo-Phosphorous Pesticides					
Azinophos Methyl	✓				
Leptophos	✓				
Organo-Halide Pesticides					
Acephate		✓			
alpha-BHC		✓			
Benefluralin		✓			
beta-BHC	✓	✓			
Dacthal (DCPA)		✓			
delta-BHC		✓			
Diallate (a)	✓	✓		✓	
Dieldrin		✓			
Endosulfan Sulfate		✓			
Endrin Aldehyde	✓				
gamma-BHC	✓				
gamma-Chlordane		✓			
Pentachoronitrobenzene (PCNB)	✓	✓			

Table 6-18 (Continued)

Analyte	**Subcategory**				
	Truck/Chemical & Petroleum	**Rail/Chemical & Petroleum**	**Barge/Chemical & Petroleum**	**Food**	**Truck/Hopper, Rail/Hopper, and Barge/Hopper**
Propachlor		✓			
Propazine		✓			
Terbacil		✓			
Terbuthylazine		✓			
Metals					
Aluminum	✓	✓	✓	✓	✓
Arsenic		✓			✓
Barium		✓			
Boron	✓	✓	✓		
Cadmium	✓		✓		
Calcium	✓	✓	✓		✓
Chromium	✓	✓	✓		✓
Copper	✓	✓	✓		
Hexavalent Chromium			✓		✓
Iron	✓	✓	✓	✓	✓
Lead			✓		
Magnesium	✓	✓	✓		✓
Manganese	✓	✓	✓	✓	✓
Mercury	✓		✓		
Molybdenum	✓		✓		✓
Nickel	✓		✓	✓	
Osmium			✓		
Phosphorus	✓	✓	✓		✓

Table 6-18 (Continued)

Analyte	Subcategory				
	Truck/Chemical & Petroleum	Rail/Chemical & Petroleum	Barge/Chemical & Petroleum	Food	Truck/Hopper, Rail/Hopper, and Barge/Hopper
Potassium	✓	✓	✓		✓
Ruthenium			✓		
Silicon	✓	✓	✓	✓	✓
Sodium	✓	✓	✓	✓	✓
Strontium	✓		✓		
Sulfur	✓	✓	✓		✓
Tin	✓				
Titanium	✓	✓	✓		✓
Yttrium					✓
Zinc	✓	✓	✓	✓	✓
Dioxins and Furans					
1,2,3,4,6,7,8-Heptachorodibenzo-p-dioxin	✓				
1,2,3,4,6,7,8-Heptachlorodibenzo-furan	✓				
Octachlrodibenzo-p-dioxin	✓	✓	✓		
Octachlrodibenzofuran		✓			
Classical Pollutants					
Adsorbable Organic Halides (AOX)	✓	✓	✓		
Ammonia as Nitrogen	✓	✓	✓	✓	✓
BOD 5-day	✓	✓	✓	✓	✓
Chemical Oxygen Demand (COD)	✓	✓	✓	✓	✓
Chloride	✓	✓	✓	✓	✓
Fluoride	✓	✓	✓		✓
Hexane Extractable Material	✓	✓	✓	✓	

Table 6-18 (Continued)

Analyte	Subcategory				
	Truck/Chemical & Petroleum	Rail/Chemical & Petroleum	Barge/Chemical & Petroleum	Food	Truck/Hopper, Rail/Hopper, and Barge/Hopper
Nitrate/Nitrite	✓	✓	✓		✓
SGT-HEM	(b)	✓	✓	✓	
Surfactants (MBAS)	✓	✓	✓	✓	
Total Dissolved Solids	✓	✓	✓	✓	✓
Total Organic Carbon (TOC)	✓	✓	✓	✓	✓
Total Phenols	✓	✓	✓	✓	
Total Phosphorus	✓	✓	✓	✓	✓
Total Sulfide (Iodometric)				✓	
Total Suspended Solids	✓	✓	✓	✓	✓

(a) Diallate represents diallate and/or diallate A and/or diallate B.
(b) EPA does not believe the SGT-HEM treatment performance data to be representative of the subcategory. EPA considers SGT-HEM a pollutant of interest for this subcategory based on the average raw wastewater concentration for this subcategory.

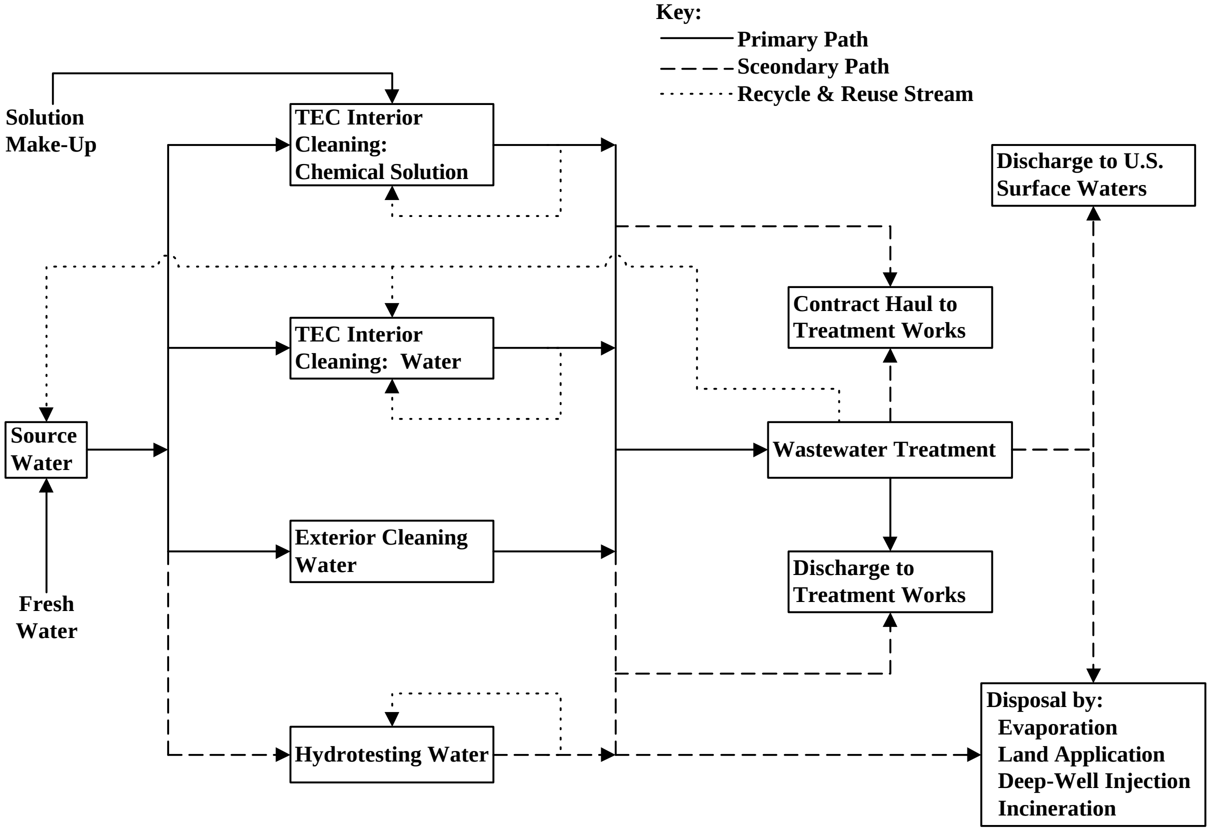

Figure 6-1. Water Use Diagram for TEC Operations